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WESTERN AUSTRALIA

REPORT

of the

Commissioner of Public Health

for the year

1954

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Report of the Commissioner of Public Health

To the Honourable the Minister for Health.

I have the honour to submit the Report of the Department of Public Health for the year 1954.

In Appendix I., the Vital Statistics show that the population has increased by a further 18,000 persons, and at the end of the year amounted to 640,086.

The death rate was 8·38 per thousand of the mean population (remaining practically stationary). The birth rate showed a slight decline to 24·88 and the infant mortality rate was 22·54—a new low record. The natural increase rate per thousand of the mean population was 16·5. These figures show a high general level of health, and it is interesting to note that the birth rate remains high.

In the opening of the Annual Report for 1953, reference was made to the need for the establishment of a Medical School in this State. At the time of writing, this proposal has been agreed to by the State Government and plans for the establishment of this School are well in hand, it being anticipated that clinical teaching will commence in 1957.

There can be no doubt that the establishment of this School will result in a progressive improvement in the standards of the medical care of the people and, also, in an improvement in public health generally.

STATE HEALTH COUNCIL.

In the course of the year there were two meetings of the State Health Council and two meetings also of the Hospital Requirements Committee and the Maternal and Infant Health Committee.

After considering the reports of these two Committees, the Council made recommendations, of which the following are the principal :—

1. The University authorities be informed that if an 800 bed hospital was ultimately provided on the University land at Hollywood for the purposes of a Medical School, it would not be disproportionate in relation to the overall planning for hospital purposes in the metropolitan area.

2. The Council confirmed the suitability in regard to siting of the areas selected for hospitals at Fremantle, Victoria Park and South Perth, Midland Junction, Hollywood, Kwinana and North of Perth (Northern Suburbs).

3. The Council recommended that the proposal for accommodation, treatment and rehabilitation of Hemiplegics, Arthritics, Fractured Femurs, Cardiacs, and Chronic Malignant cases in the Infectious Diseases Hospital at West Subiaco, be adopted, with the proviso that the scheme be expanded to include Paraplegics and allied conditions, provided that in all cases extensive surgical procedures are carried out in other hospitals.

4. The following be referred to the University Senate for opinion :
    (a) Are facilities for gynaecology required at the King Edward Memorial Hospital ?
    (b) In addition to the King Edward Memorial Hospital, or in place of the King Edward Memorial Hospital, are maternity and gynaecology inpatient and outpatient facilities required at the University Hospital ?

5. The Council confirms its opinion that the next major hospital development in the metropolitan area should be at Hollywood.

6. For the fulfilment of the expanded hospital construction programme recommended and detailed by this Council for the ensuing years, a special hospital architectural division under the Principal Architect be established in the Public Works Department.

7. A report especially prepared by the Honorary Staff of the King Edward Memorial Hospital on the Control of Pre-Eclampsia and Eclampsia was approved and was circulated to all general practitioners.

8. Ante-Natal Beds.—The Council recommended that the proportion of ante-natal beds to ordinary maternity beds at the King Edward Memorial Hospital be 30 per cent.

9. Payment of Hospital Benefits to unmarried mothers requiring ante-natal treatment for pathological conditions associated with pregnancy : The Council resolved that the Hospital Benefit Fund be approached and requested to regard certain illnesses and complications associated with pregnancy in the unmarried mother as ordinary illnesses and as such be subject to Hospital Benefits, provided the patient was insured.

10. Provision of Humicribs to Maternity Hospitals.—Resolved that a sub-committee of two, with power to co-opt, be appointed to investigate the need for the provision of humicribs at Government and Committee Maternity Hospitals and the dangers associated with their unskilled use.

11. Oxygen and Retrolental Fibroplasia.—It was resolved that the Department should give consideration to sending an informative circular to all registered midwives concerning the dangers associated with oxygen therapy in premature infants.

12. Staphylococcal Infection in Infants.—It was resolved that all relevant institutions should be requested to notify the Department of any outbreak of staphylococcal infection in infants as evidenced by septic skin lesions, " sticky eyes," or from bacteriological examination.

LOCAL AUTHORITIES.

The Royal Commission enquiring into the boundaries of local authorities in the metropolitan area has recommended a reduction in their number. If this recommendation is accepted, there should be an increased efficiency in local health administration.

Many rural local authorities continue to be handicapped by the shortage of trained health inspectors. The Department's team of inspectors provides some service, but this is intermittent and necessarily incomplete.

FOOD AND INSPECTORIAL STAFF.

During the year a re-arrangement occurred in the Inspectorial Staff. Two divisions were created—General and Meat. Mr. C. E. Flower was appointed Chief Inspector (General), and Mr. A. C. Stephens was appointed Chief Inspector (Meat). It is anticipated that a greater supervision over the work of local authority health inspectors and also over meat inspection will result as a consequence of this change.

For details of meat inspection *see* Appendix XXV.

The Annual Conference of Health Inspectors was held on 8th and 9th July, and was opened by the Minister for Health, the Hon. Mr. E. Nulsen. The following programme was submitted :—

8th July :

10·00 a.m.—Opening by Minister for Health (Hon. E. Nulsen, M.L.A.).
Address by Commissioner of Public Health (Dr. Linley Henzell).

10·45 a.m.—Recess.

11·00 a.m.—Lectures—" Food Hygiene—Manufacture and Marketing "—Mr. Ashton, President of Food Technology Association.
" Food Preservatives and Colours "—Mr. Muggleton.

12·30 p.m.—Adjourn.

2·00 p.m.—Conducted tour of Brisbane Wunderlich Sanitary Ware factory.

9th July :—

9·45 a.m.—Lecture—" Trachoma "—Professor Ida Mann.

10·45 a.m.—Recess.

11·00 a.m.—Some observations on the recent poliomyelitis epidemic.—Dr. D. J. R. Snow.

12·30 p.m.—Adjourn.

2·00 p.m.—Conference session.

HEALTH OF THE NATIVE POPULATION.

Some advance has been made in the course of the year in the provision of housing accommodation for natives. The State Housing Commission constructed 16 houses for the use of natives.

In previous reports, the great importance of housing in relationship to the health of the native population has been emphasised. Unless this problem is tackled firmly and with speed, the consequences will continue to be increasingly serious.

Although these steps have been taken in the Southern parts of the State, the need is even greater in the Kimberleys and the North-West. In these parts, where there is an increasing tendency for the natives to drift into the townships in search of employment, the conditions under which they camp in and near these townships are almost incredibly bad and are a menace to the health not only of the natives themselves but of the other inhabitants of the townships.

With this closer association between the native and the white population in townships there will be an increase in the number of half-castes born in the next generation. Unless measures are taken now to improve the housing and living standards of these natives and their future progeny, it is likely that the majority of the inhabitants in the townships in the north will be composed of natives and half-castes who will be living under slum conditions that beggar description. With the slow rate of white migration into the tropical parts of the State, the sociological implications of this increasing " coloured " population are obvious. Action is needed now to prevent this social evil.

Throughout the year discussions continued with the British Medical Association and with the Treasury concerning the most equitable arrangement to be made for the payment for private medical practitioners for the medical attention given to natives in the South-West parts of the State. Up to the present, no solution has been found and the position remains that doctors now attend natives and receive no remuneration of any kind.

This is particularly unjust in certain areas of the South-Western part of the State where there are comparatively large local centres of the native population and where therefore a comparatively few doctors have the responsibility for the medical care of the great majority of the native population. These few doctors find this a heavy burden and out of all proportion to what might reasonably be regarded as normal honorary service.

PUBLIC HEALTH LABORATORIES.

In the course of the year certain sections of the laboratories were handed over to the control of the Royal Perth Hospital, these sections (Pathology and Biochemistry) being those that more intimately concern the routine hospital work. The Haematology Department has remained under the control of Dr. Kovacs, pending the arrival of the Haematologist who has recently been appointed by the Hospital Board. The Bacteriology Laboratory has continued under the control of the Public Health Department. It undertakes the bacteriological work of the Royal Perth Hospital in addition to that of the Department.

In his report, Appendix II., Dr. Kovacs draws attention to the overall increase in the number of bacteriological examinations which have been performed in the laboratories, from 34,217 in 1953 to 37,578 in 1954.

The combined responsibilities of the laboratory, both hospital and Public Health, and the cramped space in which the staff has to work render it difficult, if not impossible, to give a completely satisfactory service either to the hospital or to the Department. With the completion of the new wing in the hospital and the transfer of the laboratories to the new premises, it may be anticipated that a more complete service will be maintained. Nevertheless, in the circumstances, the quality and range of the service had improved and expanded.

It is pleasing to note the close co-operation which exists between Dr. Kovacs and Dr. Colebatch of the Infectious Diseases Hospital, at Subiaco. In the work of this hospital the use of the new Tellurite Medium has resulted in an increase of over 30 per cent. of the positive culture for diphtheria.

In his efforts to improve the techniques of the laboratory, Dr. Kovacs has mentioned in his report the new developments which he has introduced.

The tuberculosis work continues to be done in an overcrowded space, and it will not be until the new Chest Clinic with its laboratory section is opened in Murray Street that the overcrowding will be relieved. However, this will not occur until the latter half of 1955.

The widespread use of antibiotics has introduced new problems into the laboratory control of the treatment of the acute and chronic infections. Strains of organisms have developed which are resistant to these antibiotics and a considerable part of the routine work of the laboratory is devoted to testing for sensitivity. Of particular importance is the case of the staphylococcus. Infections from this organism are particularly important in paediatrics and, indeed, this has become a world-wide problem.

For these and other reasons, a Public Health laboratory is one of the most valuable weapons in the control of any Public Health Department. Its position and facilities must be strengthened in order to carry out routine departmental work as well as those investigations which are the spirit of any active Health Department.

TUBERCULOSIS CONTROL BRANCH.

The Tuberculosis Control Branch is pursuing its campaign of action on the path which has already been laid down.

In his report, Appendix III., Dr. Alan King refers to the extension of the compulsory mass X-Ray examinations to the metropolitan area. These have been carried out smoothly.

There has been a slight decrease in the incidence of cases detected by mass radiography, which perhaps indicates a diminishing incidence of the disease in the general population, having dropped now to 0·97 per thousand of the population.

The death rate from pulmonary tuberculosis was 8·9 per 100,000— a slight increase over the previous year but still very low on world standards.

An indication of the increase in the volume of the routine work may be gathered from the fact that in the year 95,258 micro-films were taken—an increase of approximately 50 per cent. on the previous year. Since operations commenced in May, 1948, the number of micro-films amounts to over 324,000.

As in previous years, B.C.G. vaccinations have been limited to the school-leaving age groups and special groups of the population at risk. The total number of vaccinations made in the year was 2,750.

The social and economic aspects of tuberculosis control are cared for by our visiting nurse and by the payment of the tuberculosis allowance by the Commonwealth Government on a scale which is adequate for the economic needs of the people. In addition, the sheltered workshops in Perth and at the Linley Valley, Wooroloo, continue to do good work.

Acknowledgment must be made to the co-operation of the State Housing Commission in providing houses for those ex-patients whose housing conditions were sub-standard.

An interesting and significant feature of the Branch's compulsory mass radiography has been the discovery of abnormal conditions in the thorax other than tuberculosis. Dr. King points out that in the course of the follow-up of the metropolitan survey during the year an incidence of primary cancer of the lung amounting to 0·4 per 1,000 of the population has been found, almost equal to half of the incidence of active pulmonary tuberculosis.

Co-operation with hospitals and with medical practitioners in private practice continues to be close and cordial.

It is interesting to note that at the Royal Perth Hospital, which pioneered in Australia routine X–Ray examination of the chests of all their patients, the incidence of pulmonary tuberculosis has now dropped to slightly over 1 per 1,000. There can be no doubt that the work of the Medical Superintendent, Dr. R. R. Anderson, in this respect over the years has yielded significant results.

Acknowledgment must be made to Dr. John Rowe, the Medical Superintendent of Fremantle Hospital, for his assistance in the examination of micro-films of the inpatients of his hospital, and also to Dr. Mathew, the Medical Superintendent of the King Edward Memorial Hospital, and to the Honorary Radiologist, Dr. Donnan, who has examined the micro-films of all ante-natal patients in that hospital in the course of the year.

The Tuberculosis Block at the Claremont Mental Hospital was opened in March by the Commonwealth Director of Tuberculosis Sir Harry Wunderly. This is a new development in the Mental Hospitals in Australia.

Special attention should be paid to Dr. King's remarks on the incidence of tuberculosis in men employed in the gold mining industry. Significant facts are that while the number of men employed in the industry is approximately 5 per cent. of the State's total male work force, 16 per cent. of the male admissions to the Sanatorium during the year have been either gold miners or ex-gold miners. There is no doubt that while the gold mining industry might have been a great economic benefit to the State in the past, it has also acted as a blight on its public health.

Dr. King's report well repays study as the organisation of his Branch is one which may be taken as a model in tuberculosis control.

Tribute should be made to the work of Dr. Elphick, the Medical Superintendent of Wooroloo Sanatorium, who was successful in obtaining his M.R.A.C.P. in the course of the year.

Towards the latter part of the year, Dr. Elphick travelled to England for the purpose of post-graduate study and long-service leave, and the Sanatorium was ably controlled in his absence by Dr. Letham, his Deputy.

Dr. Heymanson continues to do sterling work as the Tuberculosis Physician.

Reports from Dr. Heymanson and Dr. Letham are included with Dr. King's (as Appendices IV. and V. respectively), and repay study.

COMMUNICABLE DISEASES.

In his report, Appendix VII., Dr. D. J. R. Snow, Epidemiologist, comments on the fact that although we have established measures to control the infection, diphtheria still occurs in our community with some deaths. This is a reproach to the community for its lack of co-operation in not ensuring the immunisation of the State's children.

Dr. Snow comments on an interesting investigation which illustrates the value of co-operation between private practitioners, this Department, and the Laboratory services. Attention is drawn to his remarks concerning "Margaret River Meningitis." Acknowledgment is due to the co-operation received from Dr. Barratt of Margaret River and to Dr. J. A. R. Miles of the Medical and Veterinary Research Institute, Adelaide. In this investigation, the need of a strong, well staffed and equipped laboratory service was demonstrated.

The major epidemiological event of the year was the occurrence of another poliomyelitis epidemic. This began in February and reached its climax at the time of the Visit of Her Majesty, Queen Elizabeth II, and His Royal Highness, the Duke of Edinburgh. This epidemic and its association with the Royal Visit aroused considerable press publicity throughout the world, which was hardly justified and reached scare proportions. The Department was placed in a considerable dilemma, as publicity was essential to enlist the co-operation of the public, and yet, at the same time, was seized on by the press-agencies as head-line news. In spite of this serious embarrassment, it is considered that the Department's publicity, which was based on the faecal method of spread of the infection, achieved its object in obtaining the intelligent support of the public and substantially succeeded in keeping the epidemic within limits.

Dr. Snow has dealt with this epidemic and the measures taken by the Department to attempt to control it in considerable detail (Appendix VIII.), and they may perhaps be taken as a model for future action in the event of an outbreak of the disease occurring in a community which has not been artificially immunised.

The facts are that in spite of an anticipated increase in the number of cases which might have been expected from the aggregation of large crowds of people, this increase did not occur and there is reason to believe that this was due, in part at least, to the precautions and actions taken by this Department and the associated Government Departments and authorities.

Acknowledgments are due to the services of the State Poliomyelitis Advisory Committee and also to the Poliomyelitis Committee of the National Health and Medical Research Council which paid a visit to Perth in March just before the Royal Visit took place.

ENTOMOLOGICAL SURVEY.

This survey, which was commenced in 1953, has continued progressively throughout the year. Western Australia has a very large area (about 1,000,000 square miles), and much routine work is needed to obtain a fairly accurate picture of the potential of its medical entomology.

The rate of the survey is to be speeded up during 1955, and further progress will be reported then.

VENEREAL DISEASES.

In his report, Appendix IX., Dr. D. S. Mackenzie comments on his impressions that the notification of the venereal diseases seems to be incomplete and that the treatment afforded outside the Department's clinics might well be imperfect.

His observations confirm other opinions that the professional prostitute plays a minor role in the source of infection among males.

STAFF PUBLICATIONS.

For abstracts of staff publications during 1954, *see* Appendix XIII.

MATERNAL HEALTH.

A reference to Appendix XXII shows that during the year 12 women died of causes associated with pregnancy and childbirth. Of these, five were due to abortion, some of which were of criminal origin. In order to obtain a more accurate picture of the standards of ante-natal and obstetric care as practised in this State, one should examine the figures showing the causes of deaths due to "all other complications of pregnancy and of the puerperal state." (There were no deaths from puerperal septicaemia or other puerperal infections.) It will be seen that the numbers of these deaths and the rate per thousand live births during the year and for the preceding years back to 1943, were as follows :—

Year.	Live Births.	Deaths from all other complications of pregnancy and of the puerperal State.	
		Number.	Rate.
1943	10,481	17	1·62
1944	10,870	18	1·66
1945	10,672	13	1·22
1946	12,105	18	1·49
1947	12,874	22	1·71
1948	12,981	13	1·00
1949	13,511	11	0·81
1950	14,228	12	0·84
1951	14,794	11	0·74
1952	15,413	12	0·78
1953	15,862	8	0·50
1954	15,928	7	0·44

These figures are a new low record and a comparison with those of the preceding 10 years shows a progressive improvement.

INFANT HEALTH.

This year is the last one in which Dr. Stang will submit an Annual Report because of her retirement next year. Her report, therefore, is a summary of the developments of the service over the years (Appendix XIV). The whole of the State is now covered either by the establishment of fixed or mobile centres or by the Correspondence service. In addition, a recent innovation has been a mobile service with the " Tea and Sugar Train " between Kalgoorlie and Port Augusta.

That these and other services associated with the care of mothers and children have been effective in this State may be seen from a comparison of the infant mortality (expressed as deaths of infants under the age of 12 months per 1,000 live births) occurring in the year 1954 in comparison with previous years, and in other States, as follows :—

Infant Mortality Rate (under 12 months)—

1900	126·15	per 1,000 live births.
1910	78·18	
1920	66·02	
1930	46·74	
1940	44·18	
1950	26·7	
1951	28·2	
1952	24·5	
1953	23·4	
1954	22·2	

It is of interest to note that comparable figures in 1954, were :—

New Zealand (Non-Maori)	20·01
New South Wales	25·29
Victoria	19·30
Queensland	22·29
Tasmania	23·94
South Australia	21·29

In her report, Dr. Stang makes reference to an extension of the Infant Health service to embrace children in the pre-school age group. In the past there has been a gap between the activities of Infant Health Clinics on the one hand and the School Medical Service on the other. Some attention has recently been paid to the pre-school child and routine examinations have been made at kindergartens.

It is proposed in 1955 to extend the supervision of Infant Health Nurses to pre-school children. This will require considerable re-organisation and training of Infant Health Nurses in order to qualify them specifically for this task.

Mention should be made of the policy of the State Government in subsidising the erection of new Infant Health premises. In the course of the year subsidies amounting in all to £24,376 were granted to 21 centres to assist in capital costs of construction.

The policy of maintaining a close partnership between the Local Authorities, the Lotteries Commission, voluntary agencies and the State Government should continue.

Once more, appreciation is expressed of the generosity of the Lotteries Commission in providing assistance in all cases where new Clinics are built.

SCHOOL MEDICAL SERVICE.

The activities of this section have continued as in previous years.

In her report, Appendix XVI, Dr. Stang mentions the increasing use which is being made of the Commonwealth Acoustic Laboratory for the testing of school children in whom it is suspected there may be defective hearing. This Laboratory provides an excellent service of a high order.

Once more, Dr. Stang comments on the desirability of encouraging the use of the Oslo Lunch at schools. This is largely a matter for parental education and co-operation. However, as the health education activities of the Department increase in scope and volume probably this will be one matter which will receive its attention.

Opportunity is taken to pay a tribute to the services of Dr. Ruth Anderson who has been doing School Medical work exclusively in country areas since May, 1926, and who retired during the year. Dr. Anderson was able to establish excellent relationships with teachers in the country and in spite of the difficulties associated with constant country travelling, maintained a high standard in her work. She will be difficult to replace.

As has been shown, occasion is being taken to extend the work of this Department into the pre-school age group and to correlate the activities of the Department in connection with the infant, the pre-school child and the school child. The time has come when one should consider the problems as being over-all ones related to Child Health.

It may be anticipated that a Medical School will shortly be established in this State and that the University will make an appointment of a Professor of Child Health. It will be proposed that the Professor shall act as Consultant in Child Health to the Public Health Department and that the field work of this Department will form an integral part of the teaching and practice of the professorial department.

By this means the policy of the Department in Child Health will be guided at a high level, with consequent improvements to the health of the children of the State.

SCHOOL DENTAL SERVICE.

In his report, Appendix XVIII, Mr. McKenna, the Senior Dental Officer for Schools, indicates that the routine work of his staff has been handicapped as in previous years by staff shortages.

In 1949 the complement of School Dental Officers was fixed at 14. This has not been increased over the intervening years, although there has been a great increase in the school population, because of the extreme difficulty in obtaining dentists for this type of work. At the end of 1954 there were only nine employed by the Department.

Proposals are to be made for the inauguration of a Dental Bursary Scheme for students at the University, and it is hoped that this might improve the staff position in subsequent years. In the meanwhile, the staff which is available has done all that it can with its limited resources.

NURSING BRANCH.

In her report on the Nursing Service, Appendix XIX, the Principal Matron, Miss Lee, refers to certain new developments in the course of the year.

Private hospitals are licensed under the Health Act. In order to improve the standard of the service which they give to the public, more regular inspections have been carried out by the Principal Matron and her assistant, Miss Railton, and, in each case, they are accompanied by one of the Department's Health Inspectors. The Inspector conducts a survey of the sanitary arrangements and certain structural details.

In the year greater attention has been paid to maternity hospitals and their facilities and equipment.

It is realised that private hospitals have been handicapped seriously because of rising costs, both in capital construction and maintenance, since the end of the war. However, efforts are now being made to bring their standards generally up to those of public hospitals, controlled either by the State Government or by Boards of Management under the Hospitals Act.

Because of these increasing costs, two private hospitals in the course of the year found it impossible to carry on. " Tresillian Hospital " (13 general beds, 15 maternity beds) and " Lucknow Hospital " (16 beds) were purchased by the State Government and leased to experienced Matrons to conduct as private hospitals. No doubt, this tendency, at any rate with the smaller hospitals, will continue in the future.

Post-Graduate Training of Nurses.

In Western Australia in the course of the year, two Post-Graduate courses were conducted and were well attended by senior nurses in the State.

The State Government continues to grant scholarships to senior nurses undergoing post-graduate courses at the College of Nursing, Australia. In the course of the year two scholarships have been awarded.

Nursing Bursaries.

Reference to Miss Lee's report will show an important new development in the granting of bursaries to girls while at school, in order to encourage them to remain on at school, increase the level of their educational standard and encourage them subsequently to take up nursing training. This scheme was introduced in the course of the year and it may be anticipated that it will increase the numbers and raise the educational level of girls undertaking their training as nurses in future years.

Training—General Nurses.

The shortage of trainee-nurses in the Government Hospitals continues. The requirements of the training schools provide for over 300 trainees and at the end of the year there were only 132 in service.

Proposals are being made for a recruitment campaign and, as has been mentioned, the granting of nursing bursaries will improve the position in the future.

Nursing Aides.

Reference should be made to Miss Lee's report concerning progress in the training of nursing aides.

This training continues steadily, although the output is still comparatively small.

Overall, the shortage of trained nurses in the country hospitals continues and the position is very grave.

Nurses are not the only citizens in the community who are reluctant to leave our cities and work in the country. We are becoming a nation of city dwellers and it is often overlooked that the country has much to offer that the city has not. Unless our people are prepared to go into the country all services will suffer as a consequence.

NURSES' REGISTRATION BOARD.

See Appendix XX.

CONCLUSION.

In conclusion, I would once more like to thank you, Sir, for your invariable understanding, sympathy, and guidance throughout the year.

In addition, the staff has been most co-operative and without this co-operation and their enthusiasm, the developments which have taken place in the Department would not have been possible.

LINLEY HENZELL, M.D. (London), B.Sc., D.P.H.
Commissioner of Public Health.

Appendix I.

VITAL STATISTICS — WESTERN AUSTRALIA.

—	1952.	1953.	1954.
Mean Population—			
Males	310,441	321,024	330,331
Females	291,585	301,673	309,755
Total	602,026	622,697	640,086
Births—			
Males	7,826	8,056	8,136
Females	7,587	7,806	7,792
Total	15,413	15,862	15,928
Birth rate per 1,000 of mean population	25·60	25·47	24·88
Deaths—			
Males	3,077	3,008	3,203
Females	2,132	2,064	2,161
Total	5,209	5,072	5,364
Death rate—rate per 1,000 of mean population	8·65	8·15	8·38
Natural increase rate per 1,000 of mean population	16·95	17·32	16·50
Infant Mortality per *1,000 births—			
Metropolitan area	23·52	23·28	19·59
Rest of State	27·69	24·36	25·38
Whole State	24·91	23·83	22·54
Still-births—			
Metropolitan area	125	135	129
Whole State	283	268	270

* Excluding Stillbirths.

Comparison of Infant Mortality and General Death Rate.

Place.	Infant Mortality.			General Death Rate.		
	1952.	1953.	1954.	1952.	1953.	1954.
New Zealand (*a*)	21·82	20·06	20·01	9·28	8·84	8·98
Western Australia	24·91	23·83	22·54	8·65	8·15	8·38
New South Wales	24·50	24·64	25·29	9·45	9·20	9·46
Victoria	22·29	21·15	19·30	9·99	9·50	9·19
Queensland	24·94	24·98	22·29	9·05	8·72	8·64
Tasmania	21·73	22·88	23·94	8·48	8·15	8·66
South Australia	23·09	20·65	21·29	9·53	9·19	9·01

(*a*) Non-Maori.

Appendix II.

PUBLIC HEALTH LABORATORIES.

To the Commissioner of Public Health.

The purpose of the Public Health Laboratories is primarily practical, to help in the diagnosis of infectious diseases and to perform investigations in all aspects of growth and survival of micro-organisms and viruses as related to public health with the object of obtaining information on the transmission and prevention of infectious disease. The practical side of the work is particularly emphasised in the organisation of the Public Health Laboratories of Western Australia, which not only serve the demands of the Public Health Department, but at the same time provide the bacteriological and serological service for the Royal Perth Hospital. The material which is available through both of these serivces demands an organisation which can only flourish when the practical side is combined with scientific work as a basis for further progress in the diagnosis and control of infectious diseases.

The following report is submitted on the volume and type of work done in the laboratories and this may give an opportunity to mention the research we endeavour to carry out.

The programme we planned was only slowly and partly accomplished, mainly because of the relatively junior, inexperienced staff and the extreme congestion in the laboratories. Despite these drawbacks we were able to build up, in most fields of our activity, individual methods which enable us to perform the work satisfactorily.

We introduced :—

1. A *multipurpose medium* which allows six biochemical tests to be examined in a single tube and is our screening method for enteric bacteria.
2. The *Salmonella confirmation medium* for the biochemical diagnosis of Salmonellas.
3. The *Proteus confirmation medium* for differentiation of the proteus types.
4. The *Micro-Indol method*—a modification of our Indol test.
5. A new test for quick *diagnosis of Ps. pyocyanea.*
6. A simplified method for preparing *Antibiotic discs.*
7. An improvement in *Blood culture* technique.
8. An apparatus for *filling blood and serum agar.*
9. An improved *tellurite medium* for diphtheria diagnosis.
10. *Blood media* for culture of M. tuberculosis.
11. *Gelatine Peptone-water media* for differentiation of Clostridia.
12. An improved *Milk medium* for culture of Clostridia.
13. *Containers for urine culture.* A "*catheter service* " for female patients.
14. An *enrichment medium* for *anaerobe bacteria* and Gram positive cocci.
15. An improved *Lactose-urea medium* for enteric bacteria.
16. A method for *Prothrombin time estimation.* (Wiener Klin. Wochenschrift, 1954, v. 66, p. 611). Published in German on request from the Editor of this journal.
17. A *burette for the routine water tests* for control of drinking waters.
18. Investigation into the occurrence of *B. anitratum* in Western Australia with a new method for its diagnosis.

Owing to the pressure of work only one (No. 16), of these developments has been published so far.

General Report.—The year brought great changes in the Public Health Laboratories. In April, Dr. W. A. Young, the Director of the Laboratories retired after four years of constructive work. In July the Laboratories were split up and the Pathology and Biochemistry Departments were taken over by the Royal Perth Hospital while the Bacteriological and Serological Laboratories remained under the Public Health Department and are carrying out as heretofore—the Bacteriological and Serological work of the Department and the Royal Perth Hospital.

The co-ordination of the clinical bacteriology and the other sections was maintained through the Laboratory Sub-committee and, particularly, through personal contact between the professional heads of the different laboratories.

Routine Examinations.—The number of examinations done in 1954 in the Bacteriological Department as compared with those in 1953 is illustrated in Table 1.

During 1954, the overall increase in the *Bacteriological Department* was 3,361 examinations (9·8 per cent.). Of this, work for the Royal Perth Hospital increased by 2,466 (10·6 per cent.), and the examinations for the Department of Public Health showed an increase of 895 (8·2 per cent.). The overall increase of the Bacteriological Department was adversely affected by a slight decrease in the number of examinations carried out in the Tuberculosis Laboratory. The Tuberculosis specimens of the Royal Perth Hospital decreased by 889 (29·6 per cent.) while those of the Department of Public Health increased by 521 specimens (12·3 per cent.), together accounting for a reduction of 368 (5·1 per cent.). Thus in the main Bacteriological Laboratory the increase was for the Royal Perth Hospital 3,355 (16.5 per cent.) and the Department of Public Health 374 (5·6 per cent.), or an overall increase of 3,729 specimens (13·8 per cent.). The total examinations carried out by the *Bacteriological Department* amounted to 37,578 of which the main Laboratory was responsible for 30,696 examinations and the Tuberculosis Laboratory for 6,882.

Statistics of Bacteriology Section, including M. tuberculosis and M. leprae Examinations.

	1953.			1954.		
	R.P.H.	D.P.H.	Total.	R.P.H.	D.P.H.	Total.
Bacteriology (without multiple sensitivities)	23,280	10,937	34,217	25,746	11,832	37,578
Of this M. tuberculosis and M. leprae	3,007	4,343	7,250	2,118	4,764	6,882

In previous years each single sensitivity test was counted as one test and as a routine, eight Antibiotics and Sulphonamides were tested, thus each test was multiplied by eight. This year, most of the pathogens cultured were tested against nine Anitbiotics and two Sulphonamides with the disc method, but all these 11 tests were counted as *only a single Sensitivity Test* in the statistics. To correlate the annual statistics the 1953 figures of sensitivities have been reduced. We had to revert to the expression of these tests as *one examination* to avoid showing statistically the majority of the bacteriological work done as sensitivity tests.

Table 1.

Number of Examinations.

——	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total, 1954.	Total, 1953.	Increase or Decrease per cent.
Bacteriology (without multiple sensitivities)—															
Royal Perth Hospital	1,925	1,619	1,888	1,723	1,856	2,478	1,925	2,271	1,776	2,152	2,128	1,876	23,628	20,273	+3355+16·5
Public Health Department	664	623	1,207	474	714	856	664	461	388	196	514	307	7,068	6,694	+ 374+ 5·6
M. tuberculosis and M. leprae—															
Royal Perth Hospital	155	130	213	105	188	187	142	197	175	171	204	251	2,118	3,007	— 889—29·6
Public Health Department	386	336	458	340	362	355	425	531	382	347	550	292	4,764	4,343	+ 521+12·3
Bacteriological Dept. Total	3,130	2,708	3,766	2,642	3,131	3,876	3,156	3,460	2,721	2,866	3,396	2,726	37,578	34,217	+3361+ 9·8

The Laboratory is preparing *sensitivity discs* with the following nine antibiotics :—

Penicillin
Streptomycin
Aureomycin
Terramycin
Chloromycetin
Aerosporin
Erythromycin
Bacitracin
Tetracycline

By the testing of the majority of the pathogens cultured in the laboratories with 11 discs, we try to give to the clinician the maximum aid for his choice of chemotherapy, although it should be kept in mind that the *in vivo* and *in vitro* sensitivities do not necessarily run parallel.

Antibiotic discs prepared in the laboratory with the following concentrations of the active substances were used :—

Penicillin	1 unit per disc.
Streptomycin	10 micrograms per disc.
Aureomycin	25 micrograms per disc.
Terramycin	25 micrograms per disc.
Tetracycline	30 micrograms per disc.
Chloromycetin	25 micrograms per disc.
Aerosporin	100 units per disc.
Erythromycin	10 micrograms per disc.
Bacitracin	5 units per disc.

Below we give the sensitivities of the most important species :—

Sensitivities of 300 *strains of Staphylococcus aureus haemolyticus, coagulase positive.*

	Sensitive per cent.
Penicillin	21
Aureomycin	91
Terramycin	89
Tetracycline	89
Chloromycetin	95
Erythromycin	100
Bacitracin	98

Sensitivities of the different Proteus Types and Ps. pyocyanea 60 *strains of each bacterium tested.*

	Proteus *Sensitive per cent.*	*Ps. pyocyanea.* *Sensitive per cent.*
Aureomycin	22	17
Terramycin	23	62
Tetracycline	30	3
Streptomycin	45	25
Chloromycetin	98	32
Aerosporin	28	92

Sensitivities of 100 *Enterococcus Strains.*

	Sensitive per cent.
Erythromycin	100
Chloromycetin	97
Aureomycin	83
Bacitracin	67
Terramycin	65

Sensitivity of coliform bacteria cultured from pus, sputa and urines.

	Sensitive per cent.
Streptomycin	79
Chloromycetin	95
Aureomycin	87
Terramycin	93
Tetracycline	37
Aerosporin	91

The distribution of the examinations according to the type of material is tabulated in Table 2.

There was a marked progress in different parts of the bacteriological technique. As there is still a wide distribution of *Brucellosis* among cattle in Western Australia, the importance of the Blood Culture in humans was emphasised by the introduction of the culture of the blood clot from all agglutination tests which have shown a Brucella titre of 1 : 40 or over. For *blood culture* we are using a modification of the Castaneda method with *serum agar* and *Triphenyl tetrazolium* as a growth indicator in the solid phase of the medium and further a bottle with " Liquoid." The latter specimen serves mainly for the preparation of blood agar plates for aerobic, anaerobic bacteria as well as for culture in CO_2 for Brucella and Neisseria.

All syringes used by the Public Health Laboratories are prepared by a sterile "*syringe-service.*" Luer-Lock syringes, individually packed and sterilised, are used. The use of the syringe and needle " service " practically eliminated the contamination of the blood cultures. From most of the cases more than one blood culture was taken and in many instances five blood cultures daily were required : venipunctures, inoculations of the media for growth is a heavy strain on the understaffed laboratory.

The distribution of the 11 positive *blood cultures* is as follows :—

S. typhi	3 specimens
Staphylococcus aureus	2 specimens
Streptococcus haemolyticus	2 specimens
Streptococcus viridans	3 specimens
Brucella abortus	1 specimen

Considerable progress was observed in urine bacteriology through the introduction of *new containers* and a " *urine catheter service* " for female patients. The results of urine bacteriology previously observed were irregular : repeated tests had shown big variations in the bacterial flora. Since the introduction of the above service the results for female patients practically confirm the clinical picture. The real value of this new method of obtaining urine specimens from female patients is best seen in the appreciation of the medical and nursing staff. On the request of the urological specialist the new apparatus has also been introduced in the Paraplegic Unit of the Infectious Diseases Hospital.

Seventeen positive cultures were obtained from the *C.S.F.* (excluding M. tuberculosis). The distribution of the specimens was, as follows :—

Table 2.

Examinations.	R.P.H.	P.H.D.	Total.
Bacteriology—			
Animal Inoculations	128	....	128
Blood Cultures	239	11	250
Brucella Cultures	16	1	17
Burn Swab Cultures	193	....	193
C.S.F.—(a) culture	428	46	474
(b) micro	452	46	498
Dark Ground Examinations	11	1	12
Ear and Eye Swabs—(a) culture	118	82	200
(b) micro	102	81	183
Fluids, serous cavities—(a) culture	143	68	211
(b) micro	53	10	63
Faeces cultures—(a) culture	346	170	516
(b) micro	252	146	398
Fungi, examinations	24	3	27
Gonococci smears cultures	99	1,006	1,105
K.L.B. Examinations	610	979	1,589
Other Throat Examinations (excluding K.L.B.)—			
(a) culture	187	103	290
(b) micro	14	12	26
Pus cultures	1,252	89	1,341
Sensitivity Tests	7,620	622	8,242
Sputa—(a) culture	720	3	723
(b) micro	678	3	681
Urine—(a) culture	4,114	435	4,549
(b) micro	4,497	447	4,944
Autovaccines	13	52	65
Vaginal and Cervical swabs—(a) cultures	178	267	445
(b) micro	182	267	449
Wound Swabs	71	....	71
Miscellaneous	202	33	235
M. Tuberculosis	2,118	3,992	6,110
M. leprae	13	759	772
Air and Dust	92	....	92
Milk	....	24	24
Frozen and Other Foods	....	14	14
Tinned Foods	....	7	7
Waters—(a) drinking	12	1,226	1,238
(b) river, ocean	....	547	547
Rat Survey	....	223	223
Sterility Tests	581	45	626
Total	25,759	11,819	37,578

N. meningitidis	1 specimen
Staphylococcus aureus	5 ,,
Streptococcus haemolyticus	2 ,,
Diplococcus pneumoniae	5 ,,
Cryptococcus neoformans	4 ,,

There were at least four cases of purulent bacterial meningitis which we assume were caused by *N. meningitidis* but in which the laboratories were unsuccessful in identifying the micro-organism either microscopically or by culture. These cases again prove that the urgent examination of the C.S.F. is of vital importance. From these four cases, in one only a very small amount of material was received. In two cases the specimens were received about 8 to 12 hours after the specimens had been taken and in the fourth a delay of 24 hours occurred before the examination.

The meningococci are prone to early autolysis and sometimes in a relatively short time they cannot be found. It is suggested that in every purulent meningitis two *slides* with one big drop of the C.S.F. on each, should be taken by the physician and immediately spread with a needle, loop or a slide and dried in the air. This will allow microscopical confirmation of the infection in many cases. It should be further stressed : that in each suspect case of meningococcus infection a blood culture should be taken. Another important problem is how to avoid the autolysis of the *leucoytes* during the transport of the C.S.F. The most satisfactory way would be if the Doctor in the country could himself perform the cell count. Unfortunately, only a few specimens arrive with the cell count noted. Especially in the Public Health material, where, very often, several hours or one or two days may elapse before the specimen reaches the laboratories, the cell count is much lower than it was when the specimen was taken. During the poliomyelitis epidemic very considerable differences were noticed where some of the country doctors had provided us with cell counts, and we had therewith ample material to observe the changes in the C.S.F. constituents caused by the delay during transport. At present we are preparing a method to prevent the autolysis of the cells similar to the way in which we take a small volume of the specimen in a fluoride tube to prevent glucolysis.

Our results of *faeces culture* for Salmonellas and Shigellas were most satisfactory. During 1954 we cultured 18 *Salmonella* strains from faeces. These strains comprised *S. typhi* : 12 cultures which belonged to types D_6, A, T_1. Two of the strains were untypable.* *S. paratyphoid B* : 1 culture ; Salmonella of the food poisoning group : 6 cultures. The last group were distributed among the following serological types : *S. anatum, S. newport, S.typhi murium* and *S. munich.**

Shigella bacteria were cultured in nine cases. These were divided in four cases of *Sh. sonnei* and five cases of *Sh. flexneri.*

The laboratories performed 1,589 examinations for *C. diphtheriae* in 1954.

Statistics on Diphtheria Examinations—

	Number of examinations	1,589
	Number of positive specimens	53
A.	Number of specimens examined when using Loeffler medium only	1,090
	Number of positive specimens from above	17
B.	Number of specimens examined when using both Loeffler and tellurite media	499
	Number of positive specimens from above, positive on Loeffler only, tellurite only, or on both Loeffler and tellurite media	36
	Of the 36 positive specimens :	
	Number of specimens positive on Loeffler only	2
	Number of specimens positive on tellurite only	11
	Number of specimens positive on both Loeffler and tellurite	23
	Percentage specimens positive on Loeffler	69
	Percentage specimens positive on tellurite	94

In our material the *tellurite medium gives* 36 *per cent. more positives* than the Loeffler medium, therefore, more than 30 per cent. of the cases may be missed with the latter medium only.

Unfortunately there were some cases of diphtheria in which *discrepancies* existed between the clinical diagnoses and the laboratory confirmation. Although it is accepted that the aim of the laboratory examination is mainly to confirm the diagnosis, and the diagnosis itself should be made by the clinician, it is essential that the confirmation required by the physician should be on a sufficiently high scale to be of *practical value.* For this reason we place special importance on the uniformity of the clinical and laboratory diagnoses.

To achieve this uniformity we needed the collaboration of the Infectious Diseases Branch and we have to thank Dr. Colebatch for his interest and for the help he is giving to the laboratory in this work. Although our research is still in progress, we can already say that one of the reasons for the failure of the laboratory in the confirmation of the diphtheria diagnoses, was that some of the patients had received Antitoxin, Antibiotic or Sulphonamide *therapy before the specimens were taken.* In several cases we found a heavy growth of *haemolytic Streptococci,* and in a few *Staphyloccus pyogenes* but no *C. diphtheriae.* Although the presence of these pathogens could be explained as a " mixed infection," the negative Diphtheria diagnosis should be carefully evaluated. To help physicians to establish the diagnoses in doubtful cases, each diphtheria specimen is examined for Gram positive cocci and when present they are reported. In a few of the doubtful cases we feel that there was a tendency not to take any *risk* in the clinical diagnoses. In some of the cases the *swabbing* technique could have been improved. It is obvious that the success of the laboratory examination depends on the care with which the specimen is collected.

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* For the phage typing of the *S. typhi* strains we are indebted to Dr. M. Wilson, Assistant Director of Public Health Laboratories, Melbourne, and for the serological differentiation of the other Salmonella strains to Miss Nancy Atkinson, Head of the Salmonello Reference Laboratories in Adelaide.

Last but not least, there was a further *improvement* in our *laboratory technique.* We developed a *tellurite medium* which gave over 30 per cent. more positive diphtheria cultures than the conventional Loeffler medium. The advantage of the tellurite medium is well known, but it appears that between the different tellurite media considerable differences exist. Although we have been using tellurite medium for many years, the improvement of the medium means a further progress in our diagnoses.

At present in every case sent for diphtheria examination the final diagnosis is received from the Infectious Diseases Branch or the Public Health Department and in each unconfirmed case of suspected diphtheria a questionnaire is sent to the doctor asking about treatment before the swab was taken and for his final diagnosis. At the end of the year there were only a few exceptional cases where the laboratory could not confirm the corrected diagnosis.

In *C. diphtheria*, one of the most important fields for the laboratory is the diagnosis of the carriers. From our present experience we feel that our technique is most satisfactory for finding the carriers.

Tuberculosis Laboratory.

The work of the Tuberculosis laboratory is compiled as follows :—

M. tuberculosis—

	P.H.D.	R.P.H.	Total.
Number of cases	755	497	1,252
Number of specimens	2,108	1,505	3,613
Number of examinations	3,992	2,118	6,110
Number of sputa	1,459	910	2,369
Number of gastric contents	524	180	704
Number of urines	85	276	361
Number of C.S.F.'s	4	49	53
Number of miscellaneous	36	90	126

Number of Ziehl-Neelsen stains	3,570
Number of Cultures	1,822
Number of Guinea-pig inoculations (including direct inoculation and virulence tests)	716
Number of rabbit inoculations	2

M. leprae—

	P.H.D.	R.P.H.	Total.
Number of cases	253	6	259
Number of examinations	759	13	772
Number of positives	45	3	48

The results of the examination of the *gastric contents* should be further analysed. Most of the gastric contents were collected in four per cent. NaOH, but at the end of the year this method was changed and the specimens are now collected in 4 oz. McCartney bottles containing crystallised Disodium Phosphate.

The results of the gastric contents examination are as follows :—

———	Guinea-pig and Culture Positive.	Percentage.	Guinea-pig Positive Culture Negative.	Percentage.	Guinea-pig Negative Culture Positive.	Percentage.
2nd specimen	30	48·4	8	32·0	15	65·2
3rd specimen	32	51·6	17	68·0	8	34·8
Total	62	100	25	100	23	100
From these 2nd and 3rd specimens both positive	18	....	2	....	....	....

From 44 cultures of acid fast bacteria, 23 were found to be *M. tuberculosis*.

From 704 gastric contents examinations, 110 specimens were positive.

These 110 positive specimens were divided as follows :—

Guinea-pig positive	87	79·0%	Culture positive	85	77·3%
Guinea-pig only positive	25	22·7%	Culture only positive	23	20·9%

As shown above there was no significant difference between the positive results in guinea-pig and culture.

From 2,369 *sputum* examinations 198 were positive microscopically. From the 78 positive cultures only 51 were positive in the centrifugal deposits.

From 110 *ureteric* specimens three were positive in culture and five in guinea-pig. In the urine specimens, because of the shortage of guinea-pigs, for the time being only the culture was examined and the positive cultures tested for virulence. From the ureteric specimens, although only a few in number, it can be seen that in the urine specimens the guinea-pigs give the higher percentage of positives than the culture, which is in accordance with the experience of Jensen. We hope that during the coming year we will also be able to perform the direct inoculation of guinea-pigs with urine taken before the patient has been treated.

The diagnosis of *tuberculosis meningitis* should be specially mentioned.

From 22 suspected cases 53 C.S.F. specimens were examined for tuberculous meningitis. After the corrected diagnosis *only four cases* remained as probably Tb meningitis and from these 17 examinations were done.

The results obtained show the need for further improvement in our methods. Only in one case were acid fast bacteria proved in the centrifuged deposit as well as a positive culture obtained. In a second case two positive cultures were obtained but the direct examination for acid fast bacteria was negative. In two cases, in spite of several examinations all the tests were negative. It must be mentioned that one of the latter cases had already been under antibiotic and chemotherapy treatment for five weeks when the request for the examination for Tb bacteria was received and, in this advanced state of the therapy, the chance of demonstrating acid fast bacteria is remote in the extreme.

To improve our results *new technical regulations* were laid down, particularly in regard to the *microscopical examination* which is of *primary importance* in the diagnosis of Tb meningitis. At present the microscopy is performed on multiple drops of the centrifuged deposit and care is taken to increase the thickness of these drops by overlaying them.

The greatest difficulty in giving a proper diagnosis of Tb meningitis is due to the *insufficient volume* of C.S.F. sent for examination. For a proper diagnosis 10–15 mls. fluid are required. In the two negative cases some of the samples consisted of as little as 2 ml.

Media Room.—This section is the most overcrowded of all the different sections of the Bacteriological Department.

Besides the very large quantities of media used in the Central Laboratories, we also furnished the requirements of the King Edward Memorial Hospital and the Perth Dental Hospital Laboratories, and part of the media used at the Wooroloo Sanatorium as well as the minor needs of some of the district hospitals. Apart from these, different sterile equipment, *i.e.*, glassware, cotton swabs, etc., were supplied. The Central Laboratories also prepared the Sensitivity Discs for the above branch laboratories.

The following quantities of media were supplied to the branch laboratories :—

Media in bottles	57,000 ml.
Prepared media in tubes	1,270
Prepared media in Petri dishes	184

Among further fields of activities of the laboratories, the following items should also be mentioned :—

A new method for the preparation of *Lepromin* was introduced and the new intradermal antigen is now submitted for testing.

The *dishwashing Machines* of the Royal Perth Hospital were checked and suggestions were made to the Chief Dietitian on the proper control of the apparatus. The temperature of the rinsing water, which serves the disinfection of the eating utensils should be 170° to 180° F., and is under constant check by the laboratory.

Examinations to control the bacterial flora of the *icecream dispensers* were started. For the time being we have been unsuccessful in eliminating the coliforms with hypochlorite solutions.

Experiments were done on *Cross-infection* in the operation theatre of the Royal Perth Hospital and also in the surgical wards. Ninety-two air and dust examinations collected with slit sampler, settle plates and cotton swabs with 24 sensitivity tests were done. Fifteen nasal swab examinations with sensitivity testing of the haemolytic Streptococci and Staphylococcus aureus, were performed on the staff of the operation theatre and the surgical wards. A further 60 nasal swab investigations with 35 sensitivity tests were carried out for outside hospitals.

The *nasal flora*, the bed linen and the dressings of the " *Burns Unit* " were examined and our preliminary experiments have so far established that where cases of Staphylococcus aureus were found in the wound swabs, the nasal swabs also showed the presence of pathogenic Staphylococci.

Serology Section.—During this year the *Cardiolipin* test—V.D.R.L. method—was introduced and in all serological *tests for treponema infection* Wassermann, Kahn and Cardiolipin tests were performed.

In the serological tests for treponema infections special attention was paid to the occurrence of the *reactive non-treponematic sera* in order to avoid the treatment of cases without proved specific infections. In all dubious cases the laboratory issues a printed *request* for any sign or history of a specific infection and asks for a repeated test.

We further try to interest the doctors in the *quantitative* Kahn test to control the effect of treatment and for the early recognition of a possible relapse. It should be mentioned here that the distinction between reactions according to the number of +'s is an unscientific procedure which cannot replace the quantitative test.

Mr. Drummond gives the following account of the Section :—

The number of examinations performed :

Agglutination Tests :	
S. typhi H and O	482 each
S. paratyphi " A "	480
S. paratyphi " B "	480
Proteus OX 19	482
Brucella abortus	517
R. Burneti agglutination	5
Cold Agglutinin tests	16
Anti Streptolysin " O " Titre	4
Coombs Test (Direct and Indirect)	68
Donath Landsteiner Test	1
Paul Bunnell Tests	213
Wassermann Reactions	5,494
Kahn Tests	5,216
Cardiolipin	1,657
Complement Fixation Tests (Gonococcal)	929
Complement Fixation Tests (Hydatid)	17
Pandy Tests for Globulin	266
Medico-legal examinations	154
Pregnancy Tests :	
Toad Tests	533
Friedman Tests	37
A–Z Tests (Quantitative)	21
A–Z Tests (Qualitative)	1
Sera collected, separated and packed for air transport East for viral investigations	530
Lectures to nurses, R.P.H.	24
Lectures to nurses at Medical Department, C.T.S.	16
Preliminary work on Rose and Ball Differential Sheep Cell Agglutination Test for rheumatoid arthritis	21

In the middle of 1954, the Cardiolipin (V.D.R.L.) test was added to the serological tests for Syphilis. " Wellcome " and " Difco " antigens are available, the former being in routine use at present. " Difco " Kahn antigen was substituted for locally made antigen at the end of 1954.

No diagnostic titres, or changes in titre were shown in the four *Antistreptolysin " O " tests* done during the year.

The Paul Bunnell Tests results are as follows :—

Negative tests	173
Positive presumptive tests	17
Positive differential tests	15
Negative differential tests	2
Positive tests repeated	6
	213

From the 213 examinations for infectious mononucleosis (the Paul Bunnell test) 21 tests were positive, confirmed by the guinea-pig kidney and boiled ox-blood absorption tests.

Lectures on Cross Infection and Elementary Bacteriology for trainee nurses, normally the prerogative of Registrars, were again this year prepared and given by Serology Staff.

Through lack of suitable transport much time was wasted over the lectures in distant premises of the Central Training School.

The staff of the Serological Section collected blood specimens from Como School for poliomyelitis investigations in Eastern States Institutes and also collected blood specimens for Influenza investigation. The Serological Section prepared the collecting outfits, separated the sera and air despatched them to the East.

Medico-Legal Examinations.—One hundred and fifty-four medico-legal examinations were performed in the Public Health Laboratories. These examinations have no connection with the work done by the Bacteriological Department and are a heavy burden on that Department, so much so, that these examinations are not only time-consuming, but the time spent in the Police and Criminal Courts must be taken from other important duties. It should be mentioned that the medico-legal work in other States is done either in a special laboratory or by the Pathologist.

Examinations	Total
Chemical Tests for Blood	13
Serological Tests for Blood	15
Semen Examination *a.* chemical	60
b. micro	62
Miscellaneous	4
Total	154

Photographic Laboratory Mr. Plummer reports :

Since the establishment of this department, there has been a steady increase in both the number of requests and their variety. This has necessitated the purchase of special equipment, and the department can now handle practically all requests which are likely to be received, with the exception of cine-filming.

The principal Photographic apparatus was received subsequent to October, 1954. The absence of this equipment prior to that date, was the limiting factor in work undertaken and output.

In 1954, requests for photographic services were received from :—

1. Public Health Department.
2. Central Training School " Nurses' " Home.
3. King Edward Memorial Hospital.
4. Princess Margaret Hospital.
5. Royal Perth Hospital.

Work carried out was as follows :—

1.	Books, charts, etc., received for reproduction	352
2.	X-Rays received for reproduction	81
3.	Specimens for photography	40
4.	Transparencies for Visual aids	408
5.	Patients for photography	99
6.	Photomicrographs	87
7.	Enlargements	2,102
8.	Cine filming (with camera on loan)	900 ft.
9.	Miscellaneous	52

Expansion of Laboratory Facilities.

In 1953, initial plans were prepared for the new bacteriological laboratories in the West wing on the fourth floor of the Royal Perth Hospital, and also for media rooms and animal house on the tenth floor of the Hospital. For technical reasons we had to have these designs *altered* and some parts of the original project have been completely *replanned.* Our aim was to use all recent developments in laboratory design for the new laboratories and several experimental models of equipment were tested for the new premises. An experimental bench covered with Formica laminated plastic was tried in the laboratories and after experiments were made on colour, pattern of the plastic sheets, as well as on their resistance to heat, chemicals, dyes and mechanical wear, it was suggested that the laboratory benches should be covered with light-coloured plastic sheets of " Linette " pattern and glossy surface finish.

A new plan was also designed for the expansion of the *King Edward Memorial Hospital Laboratories* and submitted to the Public Works Department.

Staffing of the Laboratories.—During the year extensive staff changes took place. Twelve new members were appointed and there were eight resignations.

Despite the new appointments the laboratories are still understaffed and the *vacant posts of the two senior technicians* are still unfilled. The progressive increase in the number of examinations, the rising standard of work as well as the introduction of new examinations, demand that the chronic deficiency of proper staff should be remedied, so much so, as the new laboratories, which we hope will be finished in 1955, should be fully staffed.

Scientific Programme for the new Laboratories.—The newly built laboratories will allow us to start with the examination of many Public Health problems with special interest to Western Australia : *i.e.*, full-scale examination of Leptospirosis, Brucellosis, Infantile Gastroenteritis, etc. Also, a lot of clinical bacteriological problems are waiting for their solution. To mention a few : the Clostridium infections, especially tetanus ; the investigation of antibiotic synergisms and antagonisms with a rapid method for practical use in treatment of bacterial infections ; the sensitivity testing for M. tuberculosis ; the elimination of Antibiotic-resistant Staphylococci. etc. We commenced on the solution of some of these problems but we have had to postpone it for lack of laboratory space and staff.

Collaboration with the different Departments of the Royal Perth Hospital.—The clinical bacteriology exercised in the Public Health Laboratories can be favourably compared with the laboratories of the Eastern States and, we feel that in many fields of activities the methods used in our laboratories are a step ahead in bacteriology.

Eastern States Visit.—The Bacteriologist spent five weeks in the various laboratories of the Eastern States to study their methods and research problems as well as to keep up contacts with the Microbiologists with a view to exchanging experiences. In this place we would like to thank the Commissioner of Public Health who made this Eastern States visit possible.

Haematological Department Report from 1st January, to 30th June, 1954.—The following Table illustrates the activities of the Haematological Department until June, 1954, when it was taken over by the Royal Perth Hospital. Dr. Pitney has been appointed as Haematologist and until his arrival the Department is under the control of the Bacteriologist.

Examinations.	R.P.H.	Public Health.	Total.
Haematology—			
Estimation of Haemoglobin	4,611	333	4,944
Counts of R.B.C's	1,494	289	1,783
Counts of Leucocytes	3,202	289	3,491
Counts of Reticulocytes	383	2	385
Counts of Platelets	243	1	244
Differential Leucocyte Counts	2,341	288	2,630
Erythrocyte Sedimentation Rates	1,489	6	1,495
Coagulation and Bleeding time and Clot Retraction, etc.	444	3	447
Erythrocyte Fragility	35	....	35
Mean Corpuscular Volume, etc.	205	2	207
Haematocrits	1,293	2	1,295
Prothrombins	819	....	819
Grouping—*a.* ABO	1,159	24	1,183
b. Rh	1,159	24	1,183
Blood films	813	254	1,067
Blood films for Malaria	8	1	9
Miscellaneous	51	....	51
Total	19,750	1,518	21,268

Department of Public Health, King Edward Memorial Hospital Laboratories. Mr. Vos reports :—

Serology of Blood Group Agglutinins.—Routine ABO and Rh typing has this year shown an increase of 29 per cent. (*see* Table 3), and represents an actual increase of 2,116 cases. This increase is largely due to routine ABO grouping and Rh typing of cord bloods from all liveborn infants at King Edward Memorial Hospital. This action was introduced with the co-operation of the Medical Superintendent, for the following reasons :—

1. To detect Rh and AB incompatibility cases not attended to ante-natally, *e.g.*, Rh positive mother, or private cases not tested for ABO group or Rh type.

2. Laboratory recording purposes for maternal and infant ABO group, Rh type, sex, disc number, and time of birth.

We have, as in the previous year, continued to ABO group and Rh type samples of blood from antenatal patients referred to this laboratory by private medical practitioners.

Routine qualitative indirect Coombs tests are carried out on all samples of Rh negative mothers during the antenatal period, and represent 3,469 tests. Rh negative mothers showing the presence of anti-Rh agglutinins have monthly indirect Coombs titrations carried out until the 34th week of gestation, and weekly tests are done if antibody behaviour indicates it necessary. The total number of requests for indirect Coombs titrations for this year is 807.

We request the attendance of respective husbands of mothers who show the presence of Rh agglutinins, n order that their homo- or hetero-zygosity can be recorded to assist in diagnosis.

The total number of serological requests in 1954 increased by 20 per cent. (see Table 3) and represents an actual increase of 6,403 tests.

Table 3.

King Edward Memorial Hospital Laboratories.

Examinations.	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total, 1954.	Total, 1953.
ABO grouping and Rh typing	631	757	722	625	807	690	958	932	874	815	732	765	9,308	7,192
Serology of blood group agglutinins	2,123	2,494	2,506	2,136	2,889	2,388	3,136	3,216	2,928	2,704	2,236	2,611	31,367	24,964
Haematology	310	321	322	324	400	475	470	600	562	333	394	405	4,916	4,296
Bacteriology (without multiple sensitivities)	512	483	929	226	*Nil**	*Nil**	369	354	265	192	269	278	3,877	2,679
Serology, Haematology and Bacteriology—Total	....	....	....	....	....	....	....	....	....	....	....	....	40,160	31,939

* Work done in the Central Public Health Laboratories.

Haematology.—Routine haematological requests for the year show a slight increase, 4,916 such requests have been recorded against 4,296 for the previous year.

Haemoglobin estimations on ante-natal and post-natal patients comprise the majority of haematological tests carried out 4,138 such requests being recorded for this year.

Preparation and Standardisation of Anti-Rh Serum.—This laboratory supplies the Public Health Laboratories, Royal Perth Hospital Blood Bank, Fremantle Blood Bank and Princess Margaret Hospital with standardised incomplete anti-Rh serum. Requests for the use of anti-Rh serum and quantity required this year increased by approximately 100 per cent., and suitable donors have to be continuously found to meet the urgent demand.

Rhesus serum willingly donated by suitable donors is tested for its specificity and $D+D^u$ reactivity, and further standardised for laboratory use. In order that specificity tests can be carried out, test cells from selected donors are kept for a period of six months or more in glycerol citrate at —20° C. and a record from each selected donor is kept with reference to their ABO, Rh, Kell Fy^a, M. N. S. Lutheran and P factor. This procedure is most essential in blood group study and the preparation of standard anti-Rh serum.

Maintenance of King Edward Memorial Hospital Blood Bank.—This work continues to be carried out in the laboratory by a qualified hospital sister. The laboratory provides reference facilities in connection with ABO grouping, Rh typing and indirect Coombs cross-matchings.

Research in Blood Group Incompatabilities and Relative Techniques.—This work continues to be carried out despite the pressure of ever-increasing general laboratory work.

New techniques in blood group serology have been developed, improved and standardised in the past two years. Their clinical and academic application has been scrutinised and if time permits, it is hoped that their publication will be forthcoming.

From the records of 350 Rh cases two publications were made :—

1. G. A. Kelsall and G. H. Vos : " The Foetal and Neonatal Wastage due to Sensitisation by the Rh Factor."
2. G. A. Kelsall, G. H. Vos, R. L. Kirk, and J. W. Shield : " The Evaluation of Cord Blood Haemoglobin, Reticulocyte percentage and Maternal Antiglobulin Titre in the Prognosis of Haemolytic Disease of the Newborn."

Bacteriology.—Work in this section increased during the year by 30·9 per cent. (see Table 3) and represents an actual increase of 1,198 tests. Improvement for anaerobic cultivation of streptococci has been instituted. The wards are daily supplied with fresh blood agar plates and Robertson meat broth for anaerobic culture.

This media is only used for cervical swabs, and inoculation of culture media is carried out in the ward immediately after taking of the specimen. This action has resulted in greater efficiency in diagnosing puerperal anaerobic streptococcal infections. It has been our experience that any delay in inoculation and laboratory attendance could influence the growth of anaerobic streptococci from cervical swabs.

Streptococcal typing is carried out to differentiate pathogens from non-pathogens in this group.

Biochemistry.—Two hundred and forty-six routine examinations were carried out in the laboratory.

General.—The haematology and serology sections of this laboratory have carried out 36,283 tests in 1954, compared with 29,260 tests in 1953, an increase of 7,023 tests.

The laboratories need additional technical and office staff if the smooth running efficiency is to continue. To relieve the congestion, to allow for the expansion of the work and for accommodation of the staff, an extension of the laboratories is urgently recommended.

Department of Public Health.—The Perth Dental Hospital Laboratories. Mr. Dockrill reports :

Owing to staff shortages only the absolute minimum of essential work was undertaken for the Perth Dental Hospital during the first four months of 1954 and most of this was taken over and performed in the Public Health Laboratories.

Hence, only a total of 462 Histological, Bacteriological and Haematological examinations undertaken for the Perth Dental Hospital can be recorded for the six months ended 30th June, 1954.

In April, Mr. T. E. Dockrill, who had been recalled to assume responsibility for the Histopathology laboratory in The Royal Perth Hospital in September, 1953, returned to assume full-time control of the Perth Dental Hospital Laboratories.

In addition to routine examination, work was also recommenced on investigations into the function of Langerhans dendritic cells and on the histology of nerve sheaths.

A paper by T. E. Dockrill, " A Comparison of Hair Follicle, Whisker and Dental Nerves," was published in the Australian Journal of Dentistry, Vol. LVIII., No. 6, December, 1954.

Acknowledgements.—This report would not be complete without thanking the staff of the Public Health Laboratories for their loyal co-operation and interest in the work. Without their enthusiasm the results reported above could not have been accomplished. I have to express my thanks especially to the first technical assistant, Mr. A. Drummond, and to the first grade technicians, Messrs. T. E. Dockrill, A. M. C. Guthrie and G. Vos, for their assistance. Mr. Drummond helped in the complicated task of the administration of the laboratories, besides carrying out his functions in the serological section.

N. KOVACS, M.D. (Vienna),
Bacteriologist.

Appendix III.

REPORT FROM THE DIRECTOR, TUBERCULOSIS CONTROL BRANCH TO THE COMMISSIONER OF PUBLIC HEALTH.

I have the honour to submit a report on the activities of this division for the year ended 31st December, 1954.

There have been no significant changes in procedure.

The most important development of interest has been the extension of compulsory mass chest X-ray examinations to the metropolitan area. These had previously been carried out in the major country centres since July, 1952.

The record low death rate for pulmonary tuberculosis of 6·9 per 100,000 of the population achieved in 1953 was not quite maintained, the figure rising to 8·9 which is still, however, very satisfactory by world standards.

The number of notifications of new sufferers during the year showed a slight decrease on the previous year's figures. It will be informative to see if this trend can be maintained as the mass radiography programme gathers momentum in the more densely populated areas.

For the first time in recent years, and in spite of the increase in population, the total number on the Case Register has shown a slight decrease. This is due to closer review of all cases.

RECORDS AND STATISTICS.

As at 31st December, 1954, there were 2,866 notified as sufferers from tuberculosis on the Case Register, including 97 non-pulmonary. Four hundred and thirty-eight were in hospital (excluding those in mental institutions) ; 1,616 were on the lists of the Visiting Nurses for the metropolitan area ; and 141 were on the list of the Visiting Nurse of the Kalgoorlie Boulder districts.

There were 382 notifications during the year, including 34 of extra-pulmonary tuberculosis.

Four hundred and thirteen were removed from the Register, including 264 in whom the disease is now considered inactive. Thirty-seven were transfers out of the State. In 15 instances a revised diagnosis was made ; and there were 85 deaths (including other causes than tuberculosis) ; and 12 individuals were untraceable.

Three hundred and twenty-six patients were in receipt of the Tuberculosis Allowance at the end of the year, of whom 253 were male and 73 female ; of these, 182 were in hospital and 144 were being treated at home.

Ninety-five thousand two hundred and fifty-eight micro films were taken—an increase of approximately 50 per cent. on the previous year—bringing the total number of exposures since commencement of operations in May, 1948, to over 324,250.

Thirteen thousand one hundred and twenty-four large films were taken, bringing the total for the same period to 70,677.

The death rate for tuberculosis of all forms was 9·5 per 100,000.

The prevalence of tuberculosis of all forms was 447 per 100,000 ; of pulmonary tuberculosis, 432 per 100,000.

Statistical Table.

Year.	Mean Population 1,000s.	Notifications.			Number on Register.			Prevalence per 100,000.		Number Receiving T.B. Allowance.	Deaths.			Death Rate per 100,000.	
		Pulm.	Non-Pulm.	Total.	Pulm.	Non-Pulm.	Total.	Pulm.	All Forms.		Pulm.	Non-Pulm.	Total.	Pulm.	All Forms.
1949	533	499	20	519	....	....	....	....	....	....	123	5	128	23·1	24·0
1950	558	586	18	604	2,100	....	....	376	....	515	125	3	128	22·4	22·9
1951	580	467	37	504	2,402	75	2,477	413	426	474	76	6	82	13·1	14·1
1952	601	508	49	557	2,574	94	2,668	428	444	396	75	7	82	12·5	13·6
1953	621	378	34	412	2,762	120	2,882	445	464	361	43	3	46	6·9	7·4
1954	640	348	34	382	2,769	97	2,866	432	447	326	57	4	61	8·9	9·5

PREVENTION.

No changes were made during the year in the scope of preventative measures.

It is pleasing to report greater help by the State Housing Commission this year in the provision of accommodation for ex-patients. Applications for assistance in this regard were investigated by the Visiting Nurses and checked by the Tuberculosis Physician in liaison with the Welfare Officer of the Commission, and as a result 45 houses were made available. The ready availability when required of improved living conditions undoubtedly has a definite bearing in the prevention of relapse of disease.

The follow-up of contacts of known cases of tuberculosis was not pursued with the same vigour this year, due to other commitments ; and only 1,923 persons reported for X-Ray examination acknowledging " contact " history. It is probable, however, that many others reported as ordinary volunteers for chest X-Ray.

The Senior Visiting Nurse reports supervision of 1,616 patients in the metropolitan area, with 6,691 visits from the staff of nine Visiting Nurses. It is pleasing to see a reduction here to 58 in the number of positive sputum potentially infectious cases.

B.C.G. VACCINATION.

B.C.G. vaccination was again restricted to the groups mentioned in last year's report, details of which are shown in the Tuberculosis Physician's report.

A slight increase of the number of Mantoux tests in the metropolitan area to some 7,000 is noted, with a resultant increase of B.C.G. vaccinations to total approximately 2,750. A number of tests and vaccinations were also carried out by the District T.B. Officers.

MORRISTON.

The babies preventorium home seems to have reached a level of function, which will probably gradually reduce in future years with the progress of our control programme.

Forty-five babies were admitted during the year for isolation and B.C.G. vaccination. In most cases the isolation was from mothers who were undergoing treatment or had had treatment previously. The daily average was 11·5 and the highest number at any one time 18.

ACTION UNDER SECTIONS 293 AND 294 OF THE HEALTH ACT.

Two persons suffering from tuberculosis in a communicable state, not conducting themselves to preclude infection to other persons, were directed to enter the Wooroloo Sanatorium for treatment.

Sixty-three persons were required " to submit to X-Ray examination of the chest for tuberculosis." Proceedings were taken against two of these persons who did not attend. They were fined by the Magistrate and subsequently reported for examination.

Forty-five of the 63 individuals were known patients who had not reported for follow-up examinations, including three at the request of the Repatriation authorities. Seventeen were for necessary follow-up of micro and country films which had shown abnormality suspicious of tuberculosis. One was a contact who did not report when requested.

The value of this follow-up is shown by the fact that of the 63 individuals brought in for examination, five entered hospital for treatment.

CASE FINDING.

Mass Radiography.

During this year the compulsory mass X-Ray effort was continued. In the first half of the year the country centres of Collie, Harvey, Manjimup, Bridgetown, Pemberton and Northam were covered—totalling 19,211 micro films ; and in the second half of the year the shift of action to the more concentrated metropolitan population took place.

By the end of the year the suburbs of Midland Junction, Guildford, Bassendean, Bayswater, Maylands, Inglewood, and Mount Lawley (partially)—totalling 35,001 miniature X-Rays—had been examined.

The findings of the compulsory metropolitan survey to-date are most satisfactory, as the incidence of proven active pulmonary tuberculosis has now dropped to one per 1,000 of the apparently healthy population (·097 per cent.). This is no doubt a result of previous case finding activities. A survey of the Midland Workshops was carried out in 1949 ; and medical practitioners in the suburbs surveyed have been active in referring suspects to the Chest Clinic.

However, apart from the 34 bacteriologically proven cases, 13 showed sufficient X-Ray evidence of disease to warrant notification ; and a further 44 suspects, although also with negative bacteriological findings, will require careful follow-up examinations.

An interesting comparison is the incidence of active pulmonary tuberculosis in the compulsory surveys in the country centres examined. It is in fact comparable to the finding of the metropolitan survey—*i.e.*, from 19,211 examinations, 15 proven active cases were discovered (·08 per cent).

As an economy measure, a 35 mm. micro film camera tunnel unit, to work with the existing X-Ray plant, was installed at the Northam Hospital for routine X–Ray examinations (particularly migrants) ; and 1,618 exposures were made.

An interesting by-product of compulsory mass radiography has been the discovery of cancer of the lung. Careful follow-up of the metropolitan survey to-date has shown an incidence of ·04 per cent. for apparent primary lung carcinoma—almost half that of the present incidence of active pulmonary tuberculosis.

SUSPECT PATIENTS REFERRED BY MEDICAL PRACTITIONERS.

Metropolitan Area.

A further refinement is necessary here to divide these patients into two groups :—

(1) With significant symptoms in which large 17 in. x 14 in. films were taken.

(2) Routine pre-marital, ante-natal, pre-insurance, and those with minor symptoms, in which miniature 35 mm. films only were taken.

There were 2,769 of the former and 2,444 of the latter, the total number referred being much less than the previous year—no doubt due to other clinic activities.

The incidence of active tuberculous disease in the first group of 12·5 per 1,000 shows that this group still remains the most important one in case finding.

The incidence in the latter group is less than one tenth of the former, and as expected is comparable to ordinary mass X-Ray findings.

Country Areas.

Country medical practitioners are co-operating very well in case finding activities.

The part-time Tuberculosis Officers at Albany, Bunbury, Collie, Geraldton, Northam, Merredin and Kalgoorlie ; Dr. A. E. Vivian, Dr. W. Lawson Smith, Dr. A. F. Walsh, Dr. A. J. Beaumont, Dr. A. McL. Robinson, Dr. W. Grey, and Dr. A. Webster respectively, set the example in this work.

The number of large films referred continues to increase, the total number received being 5,651, which number is 1,000 more than the 1953 total.

These films comprise patients of both groups referred to under metropolitan referrals ; and as would be expected, the finding is an in-between one. The finding of four cases of active pulmonary tuberculosis in each 1,000 shows the value of this work.

HOSPITAL IN-PATIENT AND OUT-PATIENT GROUP.

At the Royal Perth Hospital only 7,528 exposures were made during the year—2,293 in-patients and 5,235 out-patients.

As a result, nine active T.B. sufferers were discovered—six amongst in-patients and three amongst out-patients—and subsequently admitted to the Wooroloo Sanatorium.

The lowered incidence of disease, particularly in the out-patient group, is most striking, and indicative of progress of the tuberculosis control programme ; but as Dr. Roland Anderson, the Superintendent of the Royal Perth Hospital points out, apart from mass radiography procedures, metropolitan practitioners are now accustomed to referring their patients direct to the Chest Clinic.

It would appear at the present time the finding of almost three per 1,000 in general hospital in-patients makes full coverage of this group most important.

One thousand and thirteen micro films of in-patients at the Fremantle Hospital were examined by the Superintendent, Dr. John Rowe ; and four active cases of pulmonary tuberculosis were discovered. Re-organization during the year of the X-Ray department at this Hospital has limited the effectiveness of the work there.

Three thousand, four hundred and thirty-three micro films of in-patients at the St. John of God Hospital were examined by Clinic staff ; and three active cases of pulmonary tuberculosis were discovered.

A micro film camera tunnel unit for use with the existing X-Ray unit was installed at the end of September at the King Edward Memorial Maternity Hospital, with the co-operation of the Medical Superintendent, Dr. Mathew, with the object of ensuring as complete a coverage as possible of ante-natal patients. By the end of the year 437 films had been examined by Dr. Gordon Donnan, the Consultant Radiologist to this Branch ; but only one T.B. case was discovered.

MIGRANTS.

A considerable effort was again expended during the year to try and evaluate the incidence of pulmonary tuberculosis in migrants. It appears that the continued effort by the Commonwealth authorities abroad is now reducing the incidence to one of reasonable proportion.

From figures supplied by the Commonwealth Immigration Department, it appears there were 9,870 migrants—comprising approximately, 2,130 British full-fare paying ; 2,130 British Assisted migrants ; and 5,610 Aliens.

Four thousand, four hundred and forty-eight films were submitted by the Commonwealth Health Department for re-check. These were practically all of European migrants and the standard of the Dutch, German and Italian films was excellent. Only four cases of pulmonary tuberculosis were discovered as a result, of whom three were admitted to hospital (one from Egypt, one from Italy and one from Argentine).

One thousand, five hundred and seventy-nine individuals reported for X-Ray examination of the chest within one month of arrival, as a result of receipt of issue of pamphlets ; only one of these was found to have disease warranting notification. The number reporting is a marked improvement on the previous year, and is no doubt a result of the co-operation of the Commonwealth Health and Customs Departments in the issuing of pamphlets.

There were 16 notifications amongst arrivals during the year : 7 were of merchant seamen, of whom four were repatriated ; 4 as previously mentioned ; 2 known cases reported for treatment (one full-fare migrant admitted and one assisted migrant requiring out-patient observation) ; one a result of a routine X-ray examination ; one a temporary permit holder ; one a transfer from another State. (There is a lag in full-fare paying migrants reporting for X-ray and, during the preparation of this report, there have been several notified this year who arrived in 1954.)

There were 44 notifications of migrants who had arrived since 1948, of whom 11 were British full-fare paying ; 8 were assisted British migrants ; and 25 were aliens. Fourteen of the latter were previously known to have some disease, and this had become active ; 10 of this number were discovered by clinic follow-up.

MEDICAL CARE AND ISOLATION.

For the second time one must report no new departures in medical or surgical treatment.

Streptomycin, Para-aminosalicylic acid and Isoniazid, used together or in combinations, produce effective resolution and healing of early tuberculous lesions, and allow of tried and proven surgical procedures to complete effective control in more advanced cases.

If any trend can be noted it is the increase in the surgical procedures of resection of diseased tissue ; segmental lobectomy, lobectomy or pneumonectomy ; at the expense of the longer established lung collapse procedures of modified thoracoplasty and plombage.

Artificial pneumothorax is now very rarely used in this State, but pneumoperitoneum is being tried in a number of cases, particularly for chronic fibrotic emphysematous disease. Some apparent relief of dyspnoea in the latter is obtained in some cases. There is still definite controversy as to the efficacy of this treatment for this type of patient.

In view of the continued high relapse rate of disease—27 per cent. (80 out of 291 admissions to the Wooroloo Sanatorium for pulmonary tuberculosis), a thorough analysis of re-admissions has been made by the Acting Superintendent, Dr. Letham, the detail of which can be seen in his report.

It would appear that definite contributory factors are socio-economic and related to the family background ; and psychiatric, *i.e.*, related to temperament and personality type ; and insufficient length of stay in hospital for treatment. Apart from that, it seems that where the disease process has not been completely arrested (it is known the tubercle bacillus persists in a dormant form at the periphery of apparently healed lesions), it will always have a tendency to break out again, particularly with any lowered general resistance of the host.

This has led to a tendency in chronic patients to continue long-term suppressive drug treatment for periods of 12 months or more after discharge. This necessitates careful out-patient supervision of the patient at the Clinics and in their homes by the Visiting Nurses.

Prolonged treatment is, however, not always the answer, as there is undoubtedly a relationship between relapse and bacterial resistance which arises during the administration of antibiotics.

A recent review of surgical procedures since 1948 by the Senior Thoracic Surgeon, Mr. F. J. Clark, and the Assistant Thoracic Surgeon, Mr. A. Simpson, for publication, shows results which are most satisfactory, and which have contributed materially to the tuberculosis control programme.

This can only be briefly summarized here, but some 500 thoracoplasties, and modified thoracoplasties with leucite and Ivalon plombage, have been performed with one operative death ; and in those patients in which a two-year follow-up is possible, approximately 95 per cent. show arrested disease.

There have been just over 200 operations for the more recently developed resection procedures (which are often performed for more extensive disease), with two operative deaths ; and four deaths from late post-operative complications. Here again, where a two-year follow-up has been possible, in 87 instances only 11 have had any evidence of progression of disease.

In acknowledging the excellence of this major surgical work, one must pay tribute to the skill of the Anaesthetist, Dr. Gilbert Troup, and the team approach.

UNDERCLIFFE CONVALESCENT HOME.

By arrangement with the owners, 12 beds have been made available and have been used to complete up-grading of convalescent male patients from the Sanatorium ; and 58 patients were admitted during the year.

ROYAL PERTH HOSPITAL.

As from the beginning of the year there were three male and six female medical beds available for medical patients, and nine for surgical patients. There were 179 admissions during the year, including 73 for surgery (59 from Wooroloo). There were 41 discharges to home ; 124 transfers to Wooroloo ; and 14 to the Hollywood Hospital for further treatment by the Repatriation Commission.

REPATRIATION GENERAL HOSPITAL, HOLLYWOOD.

The number of beds available for civilian female patients remained at 17 ; and 24 patients were admitted during the year.

FREMANTLE HOSPITAL.

The small three-bed ward for female patients was used during the year for nine patients ; otherwise there were odd patients in the male wards awaiting transfer to the Sanatorium.

PRINCESS MARGARET HOSPITAL.

There were only four admissions of children with significant pulmonary tuberculosis during the year—three primary and one adult-type tuberculosis.

Four other children under the age of two years with positive Mantoux reactions indicative of primary infection were admitted for a short three months course of prophylactic treatment.

Amongst the non-pulmonary patients there were nine admissions with cervical adenitis ; three of bone and joint tuberculosis ; and three with tuberculous meningitis.

The only death was one of the latter, who was moribund and died on the day of admission.

OUT-PATIENT CLINICS.

Details of regular out-patient clinic attendances at the Perth and Fremantle Clinics are given in the following report of the Tuberculosis Physician. These do not account for numerous attendances outside the regular clinic hours, *e.g.*, new patients and country patients visiting Perth.

It can be seen that the numbers of patients attending for Artificial Pneumothorax refills is gradually decreasing, as this collapse procedure is being used less and less, the majority of patients attending being those for maintenance of a pneumothorax induced some years previously.

A small number of patients attended for Pneumoperitoneum refills. These are not usually carried on for long periods after discharge from hospital.

The amount of bacteriological investigation of out-patients remains considerable, as shown by the following figures on tests referred to the Public Health Laboratory from the Perth Chest Clinic.

	No. of Tests.	Individuals.
Sputum Examinations	1,236	338
Positive results for M. tuberculosis	163	69
Gastric Contents (cultures and guinea pig inoculations)	535	141
Positive Results (cultures and guinea pig inoculations)	149	58

The investigation work from the Fremantle Chest Clinic is mostly referred to the Fremantle Hospital laboratory. Some special investigational work is referred to the laboratory at the Wooroloo Sanatorium.

AFTER CARE AND REHABILITATION.

There has been no change in the procedure of rehabilitation measures.

The Senior Medical Officer of the Department of Social Services, Dr. W. F. Tomlinson, who works through his Education and Training Officer with the Medical Officers at the Sanatorium, and with the Tuberculosis Physician, in the selection of suitable patients, reports 25 patients were trained and placed in employment during the year ; and 34 patients were undergoing training at the end of the year.

In addition, the facilities of the Physically Handicapped Persons' Office of the Commonwealth Employment Service were made available to ex-patients requiring selected employment.

The Tuberculosis Association of Western Australia continues to make rehabilitation of ex-patients its main activity and succeeds admirably in its work. The box factory in Perth provides a most satisfactory medium for gradually increasing hours of work. During the year 28 ex-patients joined the factory staff. Twenty-one left during the year for other employment. There were 16 in employment at the end of the year.

The Manager of the Factory, Mr. Arthur Eadie, is to be complimented on his appreciation of the principles of rehabilitation as applied to the ex-T.B. patient.

The other project of the Association, namely Linley Valley Colony, adjacent to the Sanatorium, has gone through a process of re-organisation during the year in order to cut down operating costs to within the limits of the Association's finance. As a result, only an average of four to six colonists have been employed on part-time work, apart from the Manager. It is hoped the sound foundation now laid with the provision of the Tinsmithy and the associated four cottages for married personnel, and Progress House for single men, may allow of the future successful development of this ambitious scheme. Its future compass is becoming increasingly hard to define—*i.e.*, in relation to the supply of suitable colonists, the chronic patients who must live within the limits imposed on them by their illness, as these are not now nearly so common with the progress of our tuberculosis control measures in recent years.

SOCIAL AND ECONOMIC PROTECTION OF SUFFERERS.

The Tuberculosis Allowance rate remained the same, namely, £9 2s. 6d., for the married sufferer with dependent wife, plus 10s. for each dependent child ; and £3 10s. for the single sufferer in hospital ; and £5 12s. 6. for the single sufferer undergoing domiciliary treatment ; but there has been a liberalisation of the permissible other income. This was increased on 14th October, 1954, from £4 to £7 per week in the case of a married male patient, and from £2 to £3 10s. per week for single persons.

In the case of married female patients, the ceiling point in the husband's earnings while the patient is in hospital was raised from £10 to £14 per week ; and while receiving domiciliary treatment, from £14 to £18 per week.

These increases show an appreciation by the Commonwealth Government of the need to provide as much economic security for the patient as possible while undergoing treatment, and also a realisation of the encouragement necessary in allowing of some earning capacity to the patient after discharge while carrying out part-time employment and undergoing rehabilitation, before being fit enough to resume normal employment.

The 326 patients receiving the Tuberculosis Allowance as at 31st December, 1954, were classified as follows :—

Australian born	274
Migrants	52

comprising English 11 ; New Zealand 2 ; New Australians (Displaced Persons) 20 ; Italian 7 ; Greek 5 ; Dutch 2 ; Anglo-Indian 3 ; and Indonesian 2.

DEVELOPMENTS.

The extensions to the Perth Chest Clinic were commenced in April of this year, and much progress has been made. It appears that occupancy will be possible by mid 1955.

The Tuberculosis Block at the Claremont Mental Hospital was opened by the Commonwealth Director of Tuberculosis, Sir Harry Wunderly, on the 19th March. It has accommodation for 58 male and 22 female patients ; and now ensures isolation of tuberculous mental patients from other inmates of that institution and provides an ideal environment to enable modern treatment of these patients to be attempted.

Much time was spent during the year with Mr. S. Cann, Senior Architect of the Architectural Division of the Public Works Department, in completion of the plans for the 216-bed Perth Chest Hospital ; and towards the end of the year tenders were called for its erection by private contract. This resulted in a recommendation by the Principal Architect for the acceptance of the lowest tender of H. A. Doust Pty., Ltd., Perth, of £1,345,000, and final approval of this expenditure by the Commonwealth Director-General of Health.

CONCLUSION.

The anti-tuberculosis campaign in Western Australia has of necessity been geared to the availability of personnel, clinic, X-ray and hospital facilities.

What progress has been made is due to an increasing awareness by the public of the value of control measures, the stimulus provided by the enthusiastic Tuberculosis Association ; and the work of the medical profession throughout the State in co-operating with this Branch of the Public Health Department.

With the continued availability of financial support from the Commonwealth, the completion of the Perth Chest Clinic extensions and the construction of the Perth Chest Hospital should set the stage for the virtual elimination of tuberculosis as a public health menace within a decade.

My thanks are due to all members of the staff for their loyalty and hard work, particularly to the medical, nursing, clerical and technical staff of the Perth Chest Clinic who have had to work under rather crowded and difficult conditions in what has not been an easy year.

The reports of the Tuberculosis Physician and the Acting Medical Superintendent of the Wooroloo Sanatorium are attached.

I wish to express to you, Sir, my thanks for your sympathetic encouragement to my work.

ALAN KING, B.Sc., M.B., B.S., F.C.C.P.,
Director, Tuberculosis Control Branch.

Appendage to Appendix III.

PULMONARY TUBERCULOSIS IN GOLD MINERS.

The Tuberculosis Case Register in this State supplies the following facts as at 31st December, 1954 :—

Of a total number of 2,769 notified cases, there are 218 known to be ex-goldminers ; of these 138 are registered as suffering from pulmonary tuberculosis, and 80 from silicosis with superadded pulmonary tuberculosis (silico-tuberculosis).

In addition to the above, 141 ex-goldminers have been removed from the Register since 1949 (66 listed as pulmonary tuberculosis and 75 listed as silico-tuberculosis). The majority of these removals have been because of death.

An analysis of the admissions to the Wooroloo Sanatorium over the last four years shows that out of a total of 763 male admissions and re-admissions, 124 or 16 per cent. have been ex-goldminers.

ADMISSIONS TO WOOROLOO SANATORIUM.

Year.	Admissions.			Percentage of Ex-Goldminers.	Male only.
	Total.	Male.	No. of Ex-Goldminers.		
1951	237	154	23	9·7	14·9
1952	282	192	49	17·3	25·5
1953	306	210	26	8·5	12·4
1954	303	207	26	8·6	12·5
Total	1,128	763	124	11·0	16·2

The above facts must be correlated to the population of the goldfields in relation to the total population of the State, and the number of workers in the goldmining industry in relation to the total male work force in this State.

Given in round figures, there is a population of 25,000 in the goldfields related to the total population of 650,000 of the State.

The number employed in the goldmining industry varies from time to time. A fair average as at the end of the year may be taken as 6,250 (of whom only half are employed underground) as part of a total male work force of 135,500.

Other significant findings are that at the Wooroloo Sanatorium it is quite common for 20 per cent. of the male beds to be occupied by ex-miners. Allowance must be made here for the fact that these are often long term cases, but also this excludes ex-Servicemen admitted to Repatriation Institutions.

Out of the last 173 deaths at the Wooroloo Sanatorium 47 (or 27 per cent.) were ex-miners.

Summarising of the above facts suggests that the prevalence and incidence of pulmonary tuberculosis (including silico-tuberculosis) is much higher in goldminers than it should be in relation to other members of the community. This incidence has persisted in spite of special supervision and preventive measures.

MEASURES APPLIED FOR PREVENTION OF TUBERCULOSIS.

Annual chest X-ray examinations are carried out under Mines Department regulations.

Any miner suffering from pulmonary tuberculosis is excluded immediately from the industry. Miners contracting silicosis in the advanced stage leave the industry. Miners contracting silicosis in the early stage are notified of the condition and may leave the industry if they desire.

The first compulsory chest X-ray survey in this State was carried out on the adult population of the goldfields in 1952 in an attempt to discover all cases of pulmonary tuberculosis, to isolate and treat them, and so remove the risk of infection to miners (this survey excluded miners, as they are otherwise regularly examined, as above).

The State Mining Engineer, in his report, July, 1954, states 71 per cent. of underground miners and 2 per cent. of surface workers—41 per cent. of all workers in the industry—are receiving aluminium therapy as a prophylaxis against silicosis. (I am not agreed that this is of any use.)

An adequate Commonwealth Allowance is available to sufferers from tuberculosis and free hospital treatment is provided.

A Compensation Fund exists for miners contracting pulmonary tuberculosis as well as silicosis.

Legislation is such that infectious sufferers of tuberculosis may be isolated in hospital, if necessary, from the point of view of the protection of the public health.

CONCLUSION.

It is obvious that the existing measures to date have not lowered the incidence of pulmonary tuberculosis in goldminers to that normal in the community.

A further attempt will have to be made to discover each and every infectious case of pulmonary tuberculosis in the goldfields.

There is no doubt that goldminers, by reason of their occupation, and exposure to silica dust, are more susceptible to infection with pulmonary tuberculosis.

It is seriously suggested that, in spite of a possible detrimental effect to the labour force in the goldmining industry, workers contracting silicosis in the early stage be excluded from the industry and receive some compensation for this exclusion.

This would then allow these workers to leave the industry at the stage when they would be capable of taking up other work. As it is, the longer they stay in the industry the more loath they are to leave it, even though their silicosis is advancing and increasing their susceptibility to tuberculosis.

Appendix IV.

REPORT OF THE TUBERCULOSIS PHYSICIAN.

To the Director,
Tuberculosis Control Branch.

Sir, I have the honour to submit a report for the year ended 31st December, 1954.

PERTH CHEST CLINIC.

Out-Patient Clinics.

These were held three times each week.

Total attendances	3,603
Average attendance per Clinic	25
Full-size X-Rays taken	13,124

Artificial Pneumothorax Clinics.

Three Clinics are held each week.

Number of patients attending for refills as at 31st December, 1954		39
Unilateral Artificial Pneumothorax	29	
Pneumoperitoneum	10	
Number of Screenings		1,285
Number of Refills		1,094

Mass Radiography.

Perth Chest Clinic (Static Unit).

Number of 35mm. exposures		31,277
Groups X-Rayed include the following :—		
Private patients (routine)	2,444	
Armed Services	2,309	
Commonwealth Public Service Entrants	584	
State Public Service Entrants	414	
K.E.M.H. Patients	1,027	
Contacts	1,923	
Miscellaneous Groups	4,740	
Immigrants	1,215	
Volunteers	14,574	
National Service Trainees	2,047	

The total number of retakes ordered on full-size film was 837, representing 2·6 per cent. of the total.

Mobile X-Ray Unit (Metropolitan Area).

Number of 35mm. exposures		10,642
Groups X-Rayed were as follows :—		
University of Western Australia	1,109	
Teachers' Training College	459	
Armed Services	935	
Australian Glass Manufacturers	171	
Welshpool Survey	1,337	
Claremont Mental Hospital	1,570	
Lemnos Hospital	102	
W.A.G.R. Workshops, Midland Junction	2,896	
Carmelite Monastery	12	
Jewel Street, P.W.D.	194	
Power House, East Perth	423	
Gas Works, East Perth	134	
Blind School, Maylands	108	
Woodbridge	42	
National Service Trainees	1,150	

Mass Radiography Findings.

Cases of pulmonary tuberculosis notified		70
Proven bacteriologically active	55	
Under out-patient observation	15	
Suspect cases under out-patient observation		79
Incidence of proven Tuberculosis		0·08%
Non-tuberculous abnormalities diagnosed		311

These figures include the results of 29,313 compulsory Metropolitan survey films.

Cases Referred for X-Ray by Private Practitioners.

Number of patients referred (including 2,444 miniature films, and 2,769 full-size films)			5,213
Cases of pulmonary tuberculosis notified		49	
Proven bacteriologically active	35		
Under out-patient observation	14		
Suspect cases of pulmonary tuberculosis under out-patient observation		45	
Incidence of proven Tuberculosis		0·67%	
Non-tuberculous abnormalities diagnosed		561	

Mantoux Tests and B.C.G. Inoculation (Metropolitan Area).

National Service Trainees.

Mantoux Tests performed		2,310
Positive reactions	1,091	
Negative reactions	1,228	
B.C.G. Inoculations		1,087

Schools.

Mantoux Tests performed		1,678
Positive reactions	566	
Negative reactions	1,094	
B.C.G. Inoculations		1,028

Contacts (Perth Chest Clinic).

Mantoux Tests performed		1,493
Positive reactions	522	
Negative reactions	903	
B.C.G. Inoculations		257

Miscellaneous (Hospital Staffs, etc.).

Mantoux Tests performed		393
Positive reactions	205	
Negative reactions	187	
B.C.G. Inoculations		170

University.

Mantoux Tests performed		290
Positive reactions	206	
Negative reactions	84	
B.C.G. Inoculations		34
Total Mantoux Tests		6,139
Total B.C.G. Inoculations		2,642

Royal Perth Hospital—Routine Chest X-Ray of New Patients.

Number of patients followed up by this Clinic	55
Cases of pulmonary tuberculosis diagnosed and admitted to Hospital	9
Suspect cases of pulmonary tuberculosis under out-patient observation	6
Other conditions diagnosed	13

FREMANTLE CHEST CLINIC.

Out-Patient Clinics.

These were held twice each week.

Total attendances		593
Average per Clinic		7
Full-size X-Rays		1,302

Artificial Pneumothorax Clinic.

Patients attending for refills as at 31st December, 1954		12
Unilateral pneumothorax	8	
Pneumoperitoneum	4	
Total Screenings		232
Total Refills		217

Mantoux Testing and B.C.G. Inoculation.

Mantoux tests performed		774
Positive reactions	166	
Negative reactions	508	
B.C.G. Inoculations given		105

Cases Referred by Private Practitioners.

Cases referred	783
Cases of pulmonary tuberculosis bacteriologically proven	8
Cases of pulmonary tuberculosis under out-patient observation	2
Suspect cases undergoing further observation	2
Incidence of proven Tuberculosis	1·0%
Other abnormalities diagnosed	49

Mass Radiography.

Total 35mm. exposures		4,657
Groups X-Rayed were as follows :—		
Volunteers	3,335	
Armed Services	242	
Merchant Navy	377	
Commonwealth and State Public Service Candidates	25	
K.E.M.H. patients	102	
Contacts	350	
Migrants	219	
Miscellaneous	7	
Retakes on large films (134)		3%

Mass Radiography Findings.

Cases of pulmonary tuberculosis diagnosed		14
Proven bacteriologically active	11	
Undergoing out-patient observation	3	
Suspect cases undergoing further observation		19
Incidence of proven tuberculosis		0·24%
Other conditions diagnosed		104

F. E. HEYMANSON,
Tuberculosis Physician, Tuberculosis
Control Branch.

1st June, 1955.

Appendix V.

ANNUAL REPORT – WOOROLOO SANATORIUM.

For the Year ending 31st December, 1954.

The Director,
Tuberculosis Control Branch,
Chest Clinic,
17 Murray Street,
PERTH.

It is my privilege to present the Annual Report for Wooroloo Sanatorium for the year ending 31st December, 1954.

TREATMENT.

Bed Rest plus Chemotherapy.

Bed rest plus chemotherapy has continued to be the basis of treatment. In the majority of cases, the dosages of the 3 drugs used were :—

Streptomycin	1 gram twice weekly.
P.A.S.	12 grams daily, six days out of seven.
Isoniazid	300 milligrams daily.

Previous experience has shown that on this regime positive sputum could be expected to convert, in many cases, within three months. A survey of patients admitted in the first nine months of this year indicates that sputum, positive on direct smear, converts :—

(*a*) In 50 per cent. of cases to negative on culture in the first three months. In 30 per cent. of cases to negative on culture in the second three months (*i.e.*, 88 per cent. within six months.

(*b*) It is exceptional for a sputum positive only on culture to remain positive after three months.

When all patients (*a*) and (*b*) are considered the conversion rate at three months is 60 per cent., and at six months, 90 per cent.

Surgical Treatment.

Operations performed at Royal Perth Hospital were as follow :—

Apicolysis with plombage	23
Removal of plombage	3
Pneumonectomy	5
Lobectomy	16
Segmental resection	6
Unroofing of empyema	1
Modified thoracoplasty	1
Total	55

The figures above do not include those patients transferred to the Repatriation General Hospital, Hollywood, for surgery, and who were not transferred back to the Sanatorium before 31st December, 1954.

Minor Procedures.

In the Sanatorium the following procedures were carried out :—

Pneumoperitoneum—inductions	57
Pneumoperitoneum—refills	1,350
Bronchoscopies	112
Bronchograms	19
Pleural aspirations	16
Thoracoscopy	1
Phrenic crushes	6
Thoracotomy	5
Miscellaneous minor procedures	65

REHABILITATION.

This is recognised today as being an absolutely essential part of treatment. During the year 25 patients and ex-patients were trained and placed in employment, and 34 were being trained. In addition, many patients were placed in suitable employment for which they did not require special training.

The success of the rehabilitation scheme has been largely dependant on the close liaison between the Sanatorium Rehabilitation Officer, Mr. Grady, and the Industrial Officer of the Commonwealth Department, Mr. Perry, and his colleagues. They are to be congratulated on their smooth and efficient team work.

Occupational Therapy.

One hundred and sixty-five patients were given specialised occupational therapy. The outstanding feature of the year was an art and craft exhibition organised by the Occupational Therapist, Miss Legge, and the Art Therapist, Miss Nunn, and opened by Miss Elizabeth Durack. The exhibition clearly demonstrated the effectiveness of occupational therapy and of art therapy in the rehabilitation of tuberculous patients.

Linley Valley Colony.

The policy of rehabilitating permanently, but partly incapacitated ex-patients in the colony has been steadily pursued. At present the tinsmithy is faced with the difficulty of finding markets for tinware, in which, in later years, there has been a steady decline.

Fremantle Cottage, generously donated by the residents of Fremantle, was completed, and occupied, during the year. Gratitude is expressed to McNally and Reid, the builders, and to the Apex Club for their generous assistance.

Almoner.

Miss Walters dealt with 387 cases covering a wide range of problems—housing and accommodation, marital, welfare and placement of children, and many others. Many of these entailed detailed case work, numerous interviews, home visits and representation to other organisations. The indefatigable energy which the Almoner has devoted to the solution of these problems is an essential part of the effective treatment of pulmonary tuberculosis.

Entertainment of Patients.

The Adult Education Board continued to supply a variety of entertainments to patients. It is apposite to record here appreciation of the efforts of the Board ; and of the Red Cross Society which gave generous assistance in the fields of finance and the transport of artists from Perth.

ADMISSIONS, DISCHARGES, DEATHS.

Patients suffering from tuberculosis admitted for the first time		205
Patients suffering from tuberculosis readmitted		84
Patients transferred to Repatriation General Hospital, Hollywood, a few days after admission—tuberculous	5	7
non-tuberculous	2	
Patients admitted for investigation and found to be non-tuberculous		5
Total		303

Analysis of 205 *Admissions.*

Age.	Male	per cent.	Females	per cent.
Less than 20	4	3	10	14
21 — 30	18	14	25	33
31 — 40	20	15	19	26
41 — 50	30	23	11	15
51 — 60	29	22	4	5
61 and over	30	23	5	7
	131	100	74	100

These figures are in keeping with the known morbidity rates in most parts of the world.

NATIONALITY.

	In Australia less than 10 years.	In Australia more than 10 years.
British	20	131
European	26	14
Asiatic	5	1
Aboriginal	....	8
	51	154

Total : 205.

These figures include six seamen landed at Fremantle because of their disease :—

British	3
European	2
Asiatic	1
	6

Ex Gold Miners.

Twenty-six ex gold miners were admitted. Eighteen of these had been mining for over ten years, and four between six and 10 years.

Mode of Admission.

Mass Radiography—		
Metropolitan	17	
Country	11	
	—	28
Private Practitioner—		
Metropolitan	52	
Country	34	
	—	86
Hospitals—		
Royal Perth	13	
Other Institutions	8	
Country	6	
	—	27
Routine—		
Perth and Fremantle Chest Clinics	38	
Contacts	5	
Other States	6	
Routine Mining	9	
	—	58
Recalcitrant Repatriation Patients		3
Renal Tuberculosis		3
		205

Readmissions.

Of 84 readmissions—

2 had had inpatient treatment in other States.

1 recalcitrant repatriation patient was readmitted and absconded three times during the year, and was finally committed to the refractory ward.

1 recalcitrant repatriation patient with inactive disease was admitted three times during the year for intercurrent ailments.

The following information applies to the remaining 80 :—

Number of Previous Admissions.

1.	2.	3.	4.
49	18	10	3

Duration of Stay in Sanatorium following Previous Admission (Months).

0–3.	4–6.	7–9.	10–12.	13–18.	More than 18.	Not known.	Total.
13	11	12	22	11	9	2	80

Interval between Date of Last Discharge and Date of Readmission, 1954 (*Years*).

0–1.	1–2.	2–5.	5–10.	10–20.	More than 20.
26	13	25	11	4	1

Probable Cause of Readmission.

This is, in many cases, hard to assess. Where more than one cause appears to have operated the major cause has been listed. It has not been possible to assess social and economic factors. However, the patients classified under inadequate personality are, in many cases, heavy consumers of alcohol, and a number of these have a poor social background. Others in this group simply find it difficult to co-operate with treatment ; a number of these have absconded before treatment was deemed to be complete. Of the six surgical cases listed hereunder, in three of these surgery had been undertaken in the presence of extensive disease, and it is hardly justifiable to say that surgery was inadequate. In a fourth in this group an infected plomb was removed about three years after operation.

In the group listed under natural history, the disease has been of an extensive nature, not controllable by any known treatment ; or slowly progressive chronic disease. Inadequate medical treatment refers to too short a stay in the Sanatorium. The four non-tuberculous cases were patients with chronic disease with intercurrent illnesses, *e.g.*, right cardiac failure, peptic ulcer.

Readmissions.

Natural History		38
Inadequate treatment—Medical	13	
Following surgery, readmitted within five years	6	
	—	19
Inadequate rehabilitation		1
Inadequate personality		11
Non-tuberculous		4
Complications of expanding artificial pneumothorax		1
For investigation		5
Special discharge ; to return in three months for further treatment		1

An analysis of causes of readmission of patients who had been readmitted less than one year after previous discharge is as follows :—

Natural history	11
Inadequate medical treatment	2
Post surgical complications	3
Inadequate personality	4
Non-tuberculous	3
Discharged for three months ; to return at the end of that time for further treatment	1
For investigation	2
Total	26

Of 24 patients whose previous treatment was for six months or less :—

Natural history	8
Inadequate medical treatment	9
Inadequate personality	5
Non-tuberculous	2
Total	24

Discharges.

Patients discharged following treatment for pulmonary tuberculosis	232
Patients admitted for investigation and found to have inactive tuberculosis	21
Patients admitted for investigation and found to be non-tuberculous	6
Tuberculosis of the spine	1
Transferred to other hospitals, not to be returned to Wooroloo	19
Absconded	7
	286

In addition 45 convalescent patients were transferred to Undercliffe. They have been included in the statistics only if they were discharged from Undercliffe before the 1st January, 1955.

Duration of Treatment of 232 *Patients prior to Discharge.*

Weeks.	Average.	Male.	Female.	Total.
0–13 (0–3 months)	10 weeks	4	1	5
14–26 (3–6 months)	22 weeks	23	15	38
27–38 (6–9 months)	33 weeks	30	18	48
39–52 (9–12 months)	44 weeks	37	30	67
53–72 (12–18months)	60 weeks	32	13	45
73–104 (18 months-2 years)	86 weeks	17	3	20
Over 2 years	292 weeks	4	5	9
Overall average	54 weeks	147	85	232

Average Stay in Hospital.

Males	52 weeks
Females	57 weeks
All patients	54 weeks

The status of the disease of the 232 patients treated and discharged is summarised :—

Inactive	164
Arrested	54
Active disease	14

Of those 14 with active disease :—

Discharged to approved home conditions	11
Discharged to Linley Valley Colony	2
Transferred overseas under approved shipboard conditions	1

DEATHS.

Males	21
Females	2
Total	23

Of the 21 males, six were ex gold miners, and one had "worked around the mines." In two males the cause of death was carcinoma of the lung in one case, and of the pancreas in the other.

LABORATORY.

Since the beginning of the year, A. Briedis, a displaced medical practitioner, has, as senior laboratory technician, taken over the duties of Dr. Incze, who is pathological registrar. The volume and scope of the work in the laboratory has steadily increased under his able direction.

A. *Isolation of tubercle bacilli.*

Sputum and Gastric Contents—	
Sputum—	
Direct smears	2,387
Concentrate smears	425
Cultures	3,781
Culture smears	878
Gastric contents—Culture	153
Miscellaneous for Culture—	
Pleural fluids, urine C.S.F., wound sinuses	129
Guinea pigs inoculated (including gastric contents)	65
Resistance Tests—	
Streptomycin, P.A.S. Isoniazid	150
Total	9,968

B. *Other Investigations.*

Micro urine	280
Bacteriological—	
Smears and skin scrapings	198
Cultures	317
Sensitivity tests (antibiotics)	151
Haematological—	
Miscellaneous	1,169
Biochemical	55
Pathology—	
Histological specimens	403
Macroscopic specimens	23
Total	2,596
	12,564

One thousand, two hundred and eighty dozen tubes of culture media were prepared in the laboratory during the year.

X-RAY DEPARTMENT.

X-ray Examinations.

Chest—	
X–Ray of chest	3,120
Tomograms	122
Sinograms	11
Bronchograms	16
Total	3,269
I.V. pyelograms	6
Barium meals	12
Cholecystogram	6
Dental	37
Miscellaneous	293
	3,623

LEPROSARIUM.

Di-amino-diphenyl-sulphone (D.A.D.P.S.) has been used with some success. One patient was discharged and three new patients admitted. At the end of the year there were six patients receiving treatment.

STATE FARM.

Mr. Wallace, the Manager, is to be congratulated on his successes in the Illawarra Shorthorn section at the Royal Show. Twenty-four animals were exhibited, and they were awarded :—

Five first prizes.
Ten second prizes.
Four third prizes.

In addition one bull was judged Reserve Champion, and the A. E. Grant Cup was awarded for the best West Australian bred bull.

MAINTENANCE AND REPAIRS.

An extensive programme was undertaken and completed. The largest undertaking was for extensive structural alterations to cottages on the road to the poultry farm.

The construction of the new sewage disposal scheme commenced by the Public Works Department in 1953 was still in progress at the end of the year.

WOOROLOO SANATORIUM STAFF SOCIAL AND RECREATION CLUB.

In April the new premises for the club were opened by the Hon. The Minister for Health, Mr. E. Nulsen. The funtion of the club has been dependent on the voluntary services of many members. Through the efforts of these individuals, not only have the facilities of the club given enjoyment to members of the staff, but also a substantial profit is being accumulated. With this it is hoped, at a later date, to build entirely new and more commodious premises.

CONCLUSION.

In the absence of the medical superintendent, who has been absent on study and long service leave, the cheerful co-operation of the medical staff has been much appreciated. The unfailing loyalty of Matron Lochhead has been reflected in the steadfast service of her nursing staff.

For the assistance and helpful advice which, during the year, has been received from you Sir, true appreciation is expressed.

D. D. LETHAM,
Acting Medical Superintendent.

Appendix VI.

Western Australia.

PULMONARY TUBERCULOSIS.

Year.	Population in 1,000s.	Notifications Received.	Incidence Rate per 100,000 Population.	Deaths Registered.	Mortality Rate per 100,000 Population.
1911	287	259	90·2	190	66·2
1912	301	429	142·5	220	73·1
1913	313	424	135·5	206	65·8
1914	323	353	109·3	229	70·9
1915	321	336	104·7	233	72·6
1916	313	511	163·5	225	71·9
1917	306	464	151·6	217	70·9
1918	308	432	140·5	245	79·5
1919	320	467	145·9	289	91·6
1920	330	442	133·9	259	78·4
1921	334	424	126·9	277	82·9
1922	341	387	113·8	256	75·1
1923	351	361	102·8	216	61·5
1924	363	381	104·6	228	62·8
1925	373	403	108·4	259	69·4
1926	381	415	108·2	252	66·1
1927	392	409	104·3	231	56·4
1928	408	395	96·8	282	69·1
1929	421	400	95·0	245	53·4
1930	429	569	132·6	218	50·8
1931	432	372	86·1	223	51·6
1932	435	339	77·9	203	46·7
1933	439	295	67·2	207	47·2
1934	442	287	64·9	218	49·3
1935	447	270	60·4	210	47·0
1936	452	338	74·8	193	42·7
1937	457	239	53·0	172	37·6
1938	464	247	53·2	177	38·1
1939	470	202	43·0	179	38·1
1940	473	231	48·8	181	38·3
1941	474	154	32·5	185	39·0
1942	477	113	23·7	175	36·7
1943	477	273	57·3	144	30·2
1944	481	219	45·4	134	27·9
1945	488	271	55·5	149	30·5
1946	493	343	69·6	163	33·1
1947	502	372	74·0	128	25·4
1948	515	325	63·1	157	30·5
1949	533	499	93·6	123	23·1
1950	558	586	104·8	129	23·1
DEATH CLASSIFICATIONS ACCORDING TO 6TH (1948) INTERNATIONAL LIST.					
1950	558	586	104·8	125	22·4
1951	580	467	80·4	76	13·1
1952	601	508	84·4	75	12·5
1953	621	378	60·6	43	6·92
1954	640	348	54·3	57	8·9

Appendix VII.

REPORT BY THE EPIDEMIOLOGIST.

To the Commissioner of Public Health.

Sir,

Activities during the year under review conformed to the pattern described in the previous Annual Report. There was an overall reduction in the total number of notifications recorded (excluding tuberculosis, leprosy, and eye conditions) from 2,021 in the previous year to 1,755 in the current year. This was due mainly to diminished prevalence of diphtheria, hepatitis, and rubella. On the other hand there was a small increase in the number of intestinal conditions reported while a second epidemic of poliomyelitis provided the epidemiological highlight of the year. A special report on this epidemic is reproduced elsewhere (Appendix VIII) as is a table showing the " Incidence and Mortality of the Notifiable Diseases for 1954 (Appendix XXI).

The following episodes warrant special mention :—

" *Margaret River Meningitis.*"

During the month of January Dr. J. W. Barrett of Margaret River (a town with a population of about 1,000 persons, and serving a dairying district with a population of another 3,000 or 4,000 thousand) notified an outbreak of " a typical meningitis." Investigations revealed the following facts : The illness was of acute onset with headache, fever, stiff neck, and stiff back. There was no impairment of consciousness, no cranial nerve palsies, muscle weaknesses, sphincter disturbances, lymphadenopathy or Jaundice. Lumbar puncture revealed a clear fluid with increased cells (from 30 to 600 per cubic millimetre) but the differential pattern varied. Routine treatment included sulphadiazine and penicillin in orthodox dosage and symptoms generally subsided in three or four days. The age range was 1–30 years. Of the 17 cases seen only two were females. A spot-map showed a scattered distribution over a 30-mile radius. Only two cases were directly related to each other (mother and son).

Although meningococcal infection could not be ruled out entirely, the clinical picture, C.S.F. findings and smear examinations were not supportive. Serum specimens were therefore obtained and sent to Dr. J. A. R. Miles at the Medical and Veterinary Research Institute, Adelaide. They were examined and found negative for mumps, Murray Valley Encephalitis, lymphocytic chorio-meningitis, Q fever, psittacosis, and the various types of leptospirosis. So far as the poliomyelitis viruses were concerned all sera were negative to type I virus, six were positive with type II and four were positive with type III virus.

The nature of this benign form of meningitis was therefore not elucidated.

TYPHOID CARRIERS.

During the year 12 cases of typhoid fever were notified. Each was investigated in order to determine the source of infection but only in one case was infection traced to a carrier (Mrs. H., aged 77). She had been acting as housekeeper to the patient (P.B., aged 27) and her son had had typhoid in the same house four years previously. *Salmonella typhi* ('phage type I) was consistently recovered from her stools and through the co-operation of Dr. Keith Gray attempts were made to eradicate the carrier state. Two courses of chloramphenicol, each of six grammes, over three days, were without effect. A month later she was given eight grammes of terramycin over four days and her stools immediately became negative, but remained so for only a week. Three months later she was given four grammes of terramycin each day for five days and once more her stool cultures became negative, but owing to intense nausea treatment had to be suspended for several days. During the next fortnight, however, she was given three, three-day courses of terramycin, each averaging about four and one-half grammes. Throughout this period her stool cultures remained negative, but two weeks after cessation of terramycin salmonella typhi re-appeared in her stools. This experiment, therefore, although unsuccessful, indicates that future trials with newer antibiotics related to terramycin would be well worth while.

A second case of typhoid fever was a country nurse who evidently contracted the infection through nursing a patient (S.C.) suffering from the disease. It is of interest to record that this patient in turn had acquired the infection towards the end of 1953 from her mother who was found to be a carrier and was eventually subjected to a cholecystectomy after antibiotics had failed to clear her infection.

BRUCELLOSIS.

Of the eight cases, one is of particular interest. A Perth doctor's son, aged 11 years, spent a Christmas vacation on a farm in the Boyup Brook area. A fortnight after his return to Perth he developed a headache, backache, limb pains, drenching sweats and high fever. Blood culture produced *brucella abortus.* (The first time this organism has been recovered in human blood culture in the State.) Of two cousins who had also holidayed on the farm, one became ill with vague symptoms two months later and had an agglutination titre to brucella abortus of 1 in 800. The other cousin remained well but showed a titre of 1 in 200. Yet another young person who had spent some time at the farm had a titre of 1 in 500. The farmer and his wife and an adult visitor were all negative.

Raw milk was served as a routine at the farm house. It was obtained from a single Jersey cow reserved for the purpose for the last eight years, during which no investigations or immunisations for brucellosis had been sought from the veterinary authorities. Examination of the animal's blood revealed agglutinating antibodies to brucella abortus at a titre of 1 in 3,000. The association between the disease in the children and the source of infection was therefore clear, and the probable mechanism of infection was the drinking of raw milk.

DIPHTHERIA.

The 119 corrected notifications recorded represents the lowest on record for 50 years and is attributable to increasing immunisations. Owing to the poliomyelitis epidemic, however, with its attendant risk of post-inoculation paralysis, organised immunisation was suspended in February and was not resumed until five months later and then at a slower tempo than formerly. This was an unfortunate necessity as several thousand infants would have missed primary immunisations, while many thousands of school children would have missed their boosters. Safeguards against an outbreak of diphtheria were therefore reduced, and subsequent events have now shown that this apprehension was justified.

RUBELLA.

This disease (with 627 notifications) has continued at a high level and for reasons outlined in previous reports little has been done to control its prevalence, particularly among girls. Gamma globulin is now available in adequate quantity and both the public and the medical profession are sufficiently aware of the risk to unborn children for women in the early stages of pregnancy to be protected in good time following unwitting exposure to the infection.

D. J. R. SNOW, M.R.C.S., L.R.C.P., D.P.H.

Appendix VIII.

THE POLIOMYELITIS EPIDEMIC: 1954.

By

Dr. D. J. R. Snow.

The epidemiological highlight of 1954 was an epidemic of poliomyelitis. It began in February, reached a peak in March and subsided four months later. It was of unusual interest from several points of view, but acquired outstanding significance because it preceded and complicated the Royal Visit to Western Australia. This detailed report of the epidemic is presented under the following headings :—

I. BACKGROUND.

(1) *Previous Incidence of Poliomyelitis in Western Australia.*

The annual incidence of poliomyelitis in Western Australia since 1913 is shown in the accompanying histogram of notifications registered with the Commissioner (Fig. 1). This record of annual prevalence is of special interest because it illustrates certain characteristic changes which have taken place in the epidemiology of poliomyelitis in most parts of the world.

POLIOMYELITIS, W.A. – ANNUAL NOTIFICATIONS 1913 – 1954.

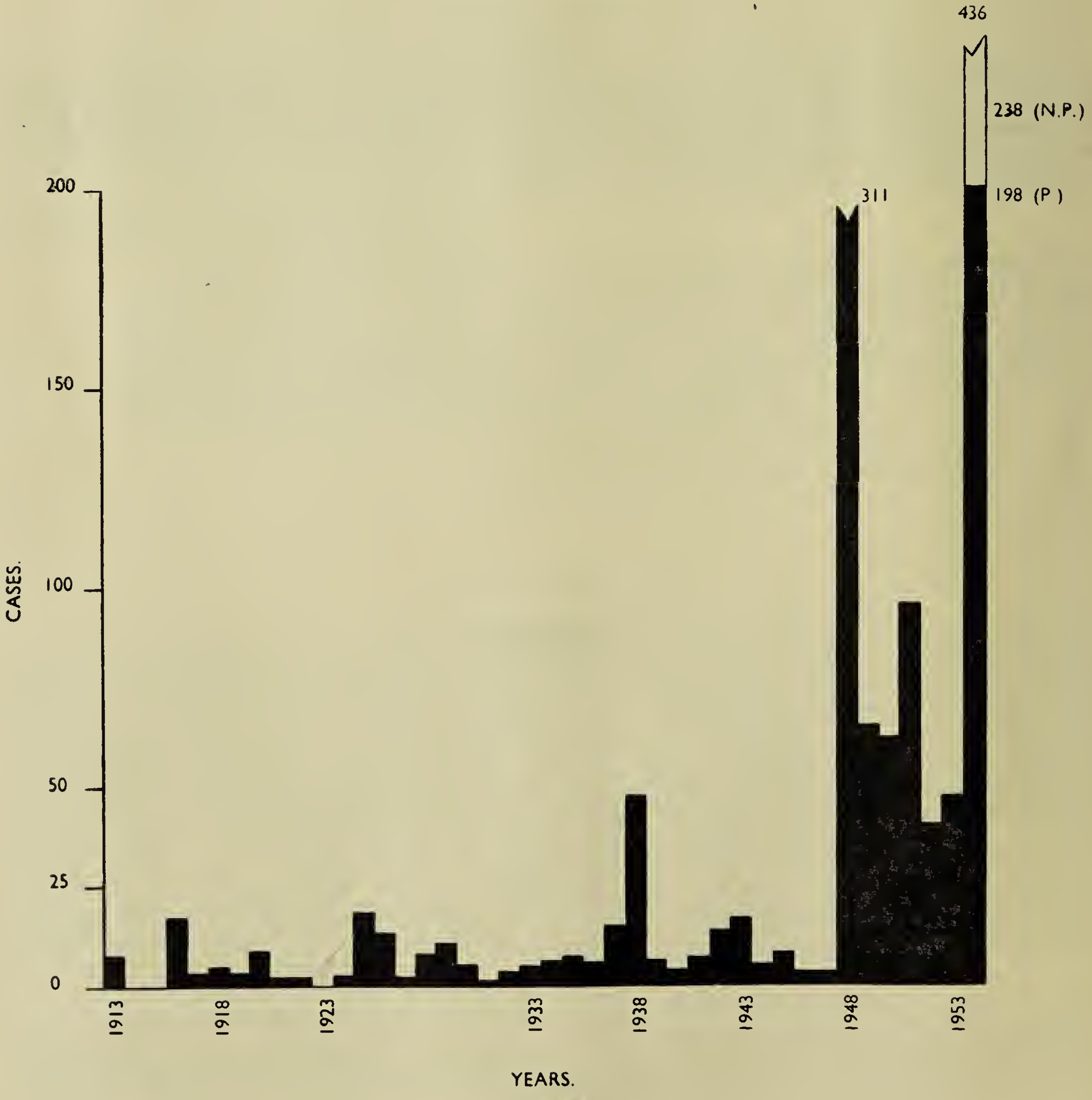

FIGURE I.

For some 25 years prior to 1938, poliomyelitis prevailed in Western Australia only in sporadic form with an average of six or seven cases a year. A small but sharp outbreak of some 50 cases then occurred during the early months of 1938. The disease then resumed its sporadic incidence and remained at very low levels until the autumn of 1948, when the first major epidemic of the disease developed and 311 notifications were recorded. During the ensuing five years, the disease persisted in endemic form with an average of 59 cases each year, until the early months of 1954, when a second major epidemic commenced. Thus it will be seen that :—

1. Sporadic poliomyelitis has changed to epidemic poliomyelitis.
2. The intervals between epidemics are becoming shorter.
3. Each succeeding epidemic is larger than the preceding one.
4. Prevalence between epidemics has been increasing.

Similar changes have occurred in other parts of the civilised world and account for the increasing attention given to poliomyelitis.

(2) *The Onset of the Epidemic.*

During the last quarter of 1953, the monthly notifications recorded were as follows :—October 2, November 9, December 11. These figures were significant only because they represented a progressive increase over the course of three consecutive months. Registrations for January, 1954, were therefore observed with special interest. In that month, 16 notifications were made. The maintenance of this progressive increase engendered a sense of uneasiness in view of the forthcoming Royal Visit and it was feared that if the February record exceeded 16, an epidemic was likely.

For reasons which will be discussed subsequently, it was decided that if 20 notifications were registered during the month of February, the commencement of an epidemic must be assumed.

One of the most disconcerting features of poliomyelitis is the difficulty of deciding whether and when an epidemic has commenced. Such a decision is of major significance, for a number of administrative measures such as postponement of immunisation, deferment of tonsillectomy, restriction of group swimming, suspension of competitive athletics and of crowd assemblies are all determined by the presence or absence of the epidemic situation. It is thus clearly desirable to have some yard-stick whereby the prevalence of poliomyelitis may be measured in order that the existence of an epidemic may be recognised. On occasion such a decision presents little difficulty. A large number of cases may occur within a very short period of time in a community with little or no previous experience of the disease. In these circumstances, the development of an epidemic is easy to acknowledge. Extensive outbreaks of this type, however, are by no means common. It is more usual for the incidence to increase gradually over the course of several weeks, and it may take some time for an epidemic trend to become apparent.

Attempts have been made in the past to apply a rule of thumb formula to this problem. For example a standard number of cases per 10,000 of the population occurring over a given calendar period has been suggested as a guide. For obvious reasons, suggestions such as this are not acceptable. The problem is peculiarly individual and local. The previous history of poliomyelitis in the area must be examined and the number of cases per week over a period of several weeks must be known. The problem is influenced by a variety of factors which vary greatly from place to place and from time to time. It is one which requires to be approached from the point of view of commonsense rather than statistics. A steady progressive increase to a high level not previously experienced for a long time is perhaps the most useful guide. The essential principles are :—

(1) Size, age structure, density, and social habits of the community afflicted.
(2) The previous prevalence of poliomyelitis within that community over the course of many years.
(3) The total number of cases in a given period of time and the relative change in the number of cases over equal consecutive intervals of time.

During the period 1949–53, inclusive, the average incidence of the disease in Western Australia had been approximately five a month. At no time during that period had the monthly incidence attained the level of 20. It was therefore considered that if the progressive increase over the months of October, November, December and January was maintained and culminated in 20 cases during February, recognition of an epidemic would be justified.

It happened that these 20 cases were recorded during the first 10 days of February and the flood of notifications which followed left no room for doubt that an epidemic had commenced.

II. ADMINISTRATION.

(1) *Initial Action.*

As soon as the commencement of the epidemic had been recognised, on February 12th the Minister issued the following statement to the Press :—

> " The progressive increase in the number of cases of poliomyelitis notified within recent months has now reached a level which indicates that an epidemic has commenced. The Commissioner of Public Health has therefore been instructed to take special measures necessary to deal with the situation."

and the Commissioner offered the following preliminary advice to the public :—

(1) Any person who is unwell with symptoms such as a headache, stiff neck, backache, limb pains or feverishness should go to bed and send for a Doctor. He should not " try to work the illness off " as strenuous exertion in the early stages of the disease can result in severe paralysis.

(2) Parents of children whose tonsils are due for removal should consult their Doctors concerning the urgency of the operation.

(3) Immunising injections (against Diphtheria, Whooping Cough, etc.), should be postponed.

(4) The utmost care in hand cleanliness should be exercised. Parents should insist on children washing their hands before meals and after visiting the toilet.

(5) Schools should not be closed. Previous experience both in this country and abroad has shown that school closure has no effect on the course of the epidemic.

(6) Swimming classes for school children should be cancelled as these encourage transference of the poliomyelitis virus and may involve undue exertion.

The following special measures were promptly taken :—

(1) A meeting of the State Poliomyelitis Advisory Council was convened, the facts were placed before it, the Department's plans were outlined and the advice of the experts on this Committee was obtained.

(2) Arrangements were made to provide additional accommodation for cases requiring hospital treatment.

(3) Orders were placed for the purchase or construction of all equipment necessary for extended physiotherapy.

(4) A Medical Officer was appointed to assist at the Infectious Diseases Hospital and at the Department.

(5) Two additional physiotherapists were engaged for work at the Infectious Diseases Hospital.

(6) Arrangements were made for skilled orthopaedic supervision of cases in hospital and at home.

(7) A Specialist in virus research from Adelaide was invited to Perth to assist in the preparation of a research programme.

(8) An approach was made to the Commonwealth Government to convene a meeting in Perth of the Poliomyelitis Committee of the National Health and Medical Research Council.

(9) A special bulletin covering all aspects of poliomyelitis control was prepared and distributed to local Health Authorities throughout the State.

(10) A leaflet setting out some simple precautions for the guidance of the public was printed and made freely available.

(11) A special form of notification devised by the Federal Poliomyelitis Committee was introduced with the object of obtaining as much information as possible from the Doctors notifying the cases ; and a standard investigation return was devised for the guidance of local Health Inspectors.

(2) *Control Measures.*

Control measures were based upon the following principles or assumptions :—

(1) Poliomyelitis is spread by personal contact ; and the major mechanism of spread of this disease is the transference of faecal particles from the infected to the susceptible.

(2) Children are more liable to infection than adults.

(3) Fatigue and certain medical and dental procedures predispose to paralysis in those who have become infected.

(4) The co-operation of the profession, public, and the press is essential in dealing with such an epidemic.

Accordingly, the following action was taken :—

(1) All registered medical practitioners were appraised of the undue prevalence of this disease and were requested to notify promptly any cases encountered by them, and to specify whether paralysis was present or not.

(2) Patients suffering from the disease were isolated for a period of 14 days, either at home or at the Hospital for Infectious Diseases.

(3) Close contacts under the age of 15 years were subjected to " house and garden " quarantine for 14 days ; while adult contacts in special categories, *e.g.*, food handlers, teachers, etc., were excluded from their occupations for a similar period.

(4) A free consultative diagnostic service was arranged for the benefit of general practitioners confronted with doubtful cases simulating poliomyelitis.

(5) The importance of personal hygiene with special reference to hand cleanliness was widely publicised ; special attention being given to children and food handlers.

(6) The early symptoms of poliomyelitis were made known to the public and they were urged to go to bed and send for a Doctor if any of these symptoms developed ; the harmful effect of fatigue being specially stressed.

(7) Immunisation clinics were suspended, intra-muscular therapy was discouraged, and elective operations in the nose, mouth and throat were postponed.

(8) An intensive anti-fly campaign was instituted.

(9) Swimming classes were cancelled.

(10) A small stock of gamma-globulin was obtained from the Commonwealth Authority for the passive immunisation of selected contacts.

(11) Social gatherings involving unaccustomed personal contacts especially among children from different areas were discouraged ; picnics, parties, youth rallies and the like were cancelled.

(12) The sharing of towels and cups was discouraged.

(13) Special instructions were issued to all local Health Authorities.

(14) Schools were sprayed to control fly spread ; and sanitary conveniences, rubbish bins, washrooms and play sheds were specially treated.

(15) Regular press statements were issued at frequent intervals dealing with one or other of the innumerable questions raised by members of the public ; and a periodical statement of notifications was released.

(3) *Local Authorities.*

The special action requested of local authorities was set out as follows :—

Upon receipt of a notification, the Health Inspector was to visit the affected home and :

A. Interrogate the relatives about—

(1) The patient's first signs of illness in order that the precise date of onset might be fixed ;

(2) the patient's movements during the 14 days prior to the onset in order to find out where infection might have occurred ;

(3) any association of the patient with persons suffering from " suspect " illness such as influenza, gastro-intestinal upsets and so on ;

(4) any illnesses in the other members of the household.

B. Identify any *close contacts* (*see* footnote) and issue instructions that those to whom restrictions applied be quarantined for 14 days from the date of onset of symptoms in the patient (in the case of household or other daily contacts), or from the date of contact (where contact was close but limited to one occasion). Quarantine was modified according to age. Thus :—

(i) Pre-school and school children were to be confined to home and garden for 14 days. In effect this meant that all close contacts under the age of 15 years were to be restricted. They were permitted to be taken for drives, etc., in private or family vehicles provided there was no possibility of close contact with other people whilst away from home ;

(ii) No restrictions were placed on adults (all those over the age of 15), unless engaged in particular occupations such as the preparation or handling of food for public consumption, *e.g.*, milkmen, bread carters, cooks, waitresses and the like. Close contacts in these categories were to be debarred from this this type of employment for 14 days.

C. Check on the general hygiene and sanitation of the home in question and take steps to see that any defects were promptly rectified. Particular attention was to be paid to privies and garbage.

D. Submit a brief report to the Commissioner of Public Health setting out the main facts in a special pro-forma. The main objects of this special pro-forma were to determine the presumptive place and source of infection, to obtain indications of the mode of spread if possible, and to collect general epidemiological information likely to be of some assistance in controlling the epidemic. As can well be imagined, a vast amount of data was accumulated and examined but no information of special value emerged. The increased activity of local authorities, however, had a beneficial effect in improving the general standard of hygiene and sanitation in the areas involved.

(4) *Home Treatment.*

The introduction of home treatment as a principle in the management of epidemic poliomyelitis was an innovation dictated by expediency but justified by current epidemiological knowledge. It was undertaken with a certain amount of misgiving on the grounds that it would be unacceptable to the public.

The measure was discussed at length at a meeting of the State Poliomyelitis Committee which regarded the problem from two points of view. Firstly, the welfare of the patient. Secondly, the interests of the community. From the patient's point of view, it was evident that the non-paralytic cases and cases with minimal paralysis could be treated by rest in bed at home just as satisfactorily as in a special hospital. Undue pressure on special hospital beds would thus be avoided.

From the point of view of community protection, provided that the patient's excreta and contaminated linen were treated in the same way as that of a typhoid patient, the other members of the household, neighbours and the general public would not be exposed to increased risk of infection. The State Poliomyelitis Committee on February 16th accordingly resolved as follows :—

> " Where conditions are suitable, no risk to the public or to the patient is entailed in treating the less severe poliomyelitis cases in their own homes. The disposal of individual cases should therefore be left to the discretion of the family doctor, acting where necessary in conjunction with the Public Health Department or a consultant. Patients so treated should in any event be confined to their homes for not less than 14 days and close contacts of school age should also be excluded from school and subjected to " house and garden " quarantine for 14 days from the onset of symptoms in the patient."

In amplification of the above resolution :—

(1) The phrase " where conditions are suitable " meant that where accommodation, general standard of hygiene, sanitation, and facilities for segregation were reasonable then there would be no added risk to the neighbours or the local community ;

(2) Patients suitable for home treatment were regarded as including all non-paralytic cases, cases with minimal palsies, and certain other cases with mild to moderate paralysis. It was not intended to apply to cases with any suggestion of respiratory embarrassment or difficulty in swallowing ;

Definition of close contact : A close contact was defined as a person who had been in undue and/or repeated association with a notified case at any time subsequent to the onset of first symptoms. The term included brothers and sisters, parents, favourite playmates and children sitting on each side of the patient in the classroom or sleeping on each side of the patient in the dormitory.

(3) Efforts were made to organise domiciliary orthopaedic supervision and physiotherapy services for those cases who were unable to pay for these services in the usual way.

(4) From the nursing point of view, these patients were to be handled under conditions comparable to the " barrier precautions " which are used for typhoid fever.

For the guidance of Local Authorities in connection with cases treated at home, the following recommendations were made :—

(a) Where premises are serviced by the pan system, a twice weekly " typhoid service " should be provided. Pans should have five ounces of Izal, Faucol or Cyllin together with half a gallon of water placed in them before delivery. The contents should be disposed separately at the sanitary site and pans washed, burnt out and freshly tarred before return to service.

(b) Where the premises are connected to the sewer or are provided with septic tanks, the patients' faeces may be disposed of by that means. Care should be taken to see that disinfectants are not introduced into septic tanks. Bed pans should be washed to visible cleanliness and the contents disposed of in the pedestal pan. The bed pans should then be immersed in a disinfectant solution for half an hour and then allowed to dry. It is recommended that one of the following disinfectants be used :—Lysol, Dettol, Solyptol or Ellisol, all in 2-3 per cent. solution (one tablespoonful to a pint of water).

(c) Patients' eating utensils, etc., should be kept separate and washed separately with soap powder and very hot water. Disposable articles should be burnt. Soiled linen, handkerchiefs and the like should be soaked in a disinfectant solution for half an hour or boiled before being laundered.

(d) A general inspection of the premises and those nearby should be made to eliminate sanitation defects and fly breeding. Anti-mosquito nets for the vents of septic tanks should be replaced immediately if defective.

(e) Privies should be sprayed weekly with 5 per cent. D.D.T. solution.

The introduction of home treatment was an outstanding success. It greatly relieved the pressure on available beds at the Infectious Diseases Hospital, and was accepted by parents and public alike without demur. Finally, there was no evidence whatever to indicate that the measure encouraged dissemination of infection, and no secondary cases could be attributed to it. The principle therefore is recommended in future epidemics, either in this State or elsewhere providing that the precautions indicated are observed.

(5) *Public Relations.*

The panic potential of epidemic poliomyelitis is outrivalled by few other diseases. This particular epidemic coinciding as it did with an historic social occasion, was especially embarrassing to the authorities concerned.

The public is clearly entitled to the fullest information during times of emergency, and indeed unless co-operation is assured, effective control is unlikely. Nevertheless, it is extremely difficult to avoid aggravating panic in presenting the facts. The most well intentioned and balanced official statement which might well have gone in normal print on the middle page can acquire a most alarming aspect if it is transferred to the front page, printed in heavy type and under a conspicuous headline. Perspectives can be altered in an extraordinary manner in this way.

At the outset of the epidemic a conference was called of representatives from the daily newspapers and the A.B.C. and it was agreed that a statement would be issued twice weekly setting out the number of notifications received and the general trend. In addition, brief pronouncements were to be issued covering specific questions with which the public was likely to be specially concerned.

Soon after the epidemic commenced the Department was bombarded through the medium of the post, telephone and personal approaches with a barrage of questions and a host of suggestions for preventing, controlling or curing poliomyelitis. Literally hundreds of enquiries dealt with such simple problems as to whether some particular picnic should be postponed or some party cancelled. The enquiries reached such proportions that it became necessary to publish a special appeal requesting that these enquiries be confined to special hours ; and every endeavour was made to deal with the more standard type of enquiry in peridoical press announcements. Nevertheless these enquiries continued, although in diminishing volume.

Meanwhile the imminence of the Royal Tour placed the epidemic in a fierce light of publicity and was treated especially by the Eastern State Newspapers as an item of sensational news value. The manner in which simple facts were glamorised and highlighted grossly distorted perspectives, spread alarm and despondency, and tended to inflate the panic to almost unmanageable proportions.

The Department was bitterly criticised in releasing as much information as it did to the press, and was accused of stimulating and aggravating panic. Whether this criticism was justified or not must be left to the judgment of others. Nevertheless, it must be realised that the intention of the publicity in question was designed :—

(1) To encourage people to seek medical attention at the very outset of the illness so that by prompt diagnosis and appropriate treatment, paralysis would either be prevented or minimised ; and timely isolation would reduce the risk of infection to other people.

(2) To encourage extreme hand cleanliness with the object of obviating the transfer of infection from person to person ;

(3) To take the public into the confidence of the authorities with a view to securing the maximum co-operation possible.

There is much evidence to show that these intentions met with success, which was of great benefit to the community as a whole. Thus the proportion of paralytic to non-paralytic cases was very much smaller than is usual with epidemics of poliomyelitis, and those cases in which poliomyelitis did occur were generally of the mild type ; further, the number of deaths was only one-third of those which would normally have been expected in the circumstances. And all this in spite of the fact that the virus shown to be responsible for the epidemic was of the notorious Brunhildë (or Type I) variety which regularly produces paralysis.

(6) *Medical and Physiotherapy Services.*

In order that general practitioners confronted with cases of doubtful nature might be assisted from the point of view of diagnosis, Dr. I. O. Thorburn was appointed Consulting Physician (poliomyelitis). The fee for this consultative service was met by the Government and no charge was levied against the patients.

A panel of specialist orthopaedic surgeons, comprising Dr. Dawkins (Director of Poliomyelitis Orthopaedic Services), Drs. Hill, Pannell, Gilmour and Bedbrook was appointed for the purpose of assessing the patient's disability at an early stage and supervising the management of the after-care phase. Special clinics were established at the Infectious Diseases Hospital, Royal Perth Hospital, Fremantle Hospital and Children's Hospital whilst in some cases patients attended the rooms of the specialists themselves. The cost of these services also was borne by the Government, no charge being levied against patients. Physiotherapy services were based at the Infectious Diseases Hospital where Mr. Keating, Director of the School of Physiotherapy, very kindly undertook to organise special services necessary for poliomyelitis.

Four physiotherapists were appointed for work in connection with poliomyelitis, and arrangements were made for the development of a domiciliary physiotherapy service for selected cases. These physiotherapists were under the highest pressure for a period of approximately three months and it is difficult to over-estimate the value of the work they did.

The Domiciliary Physiotherapy Service, however, did not develop along the lines which had been anticipated, and it is unlikely that this service can be justifiably expanded in the future in preference to treatment at recognised static centres. Physiotherapists are perpetually in short supply, are attracted more strongly to private practice than salaried service, and prefer handling a variety of physical disabilities rather than concentrate upon one particular disease or specialty. Further, domiciliary service involves considerable travelling time and is wasteful of man hours. Finally, a number of physiotherapists do not possess their own motor vehicles and the success of such a service would necessitate the provision of a pool of vehicles at Government expense.

Indeed the demand for domicilary service was relatively small and most surgeons and patients themselves preferred to attend for treatment at one or other of the serveral establishments where free physiotherapy was available. The policy has been to make free domicilary physiotherapy available only in special cases where peculiar difficulties exist.

(7) *Equipment and Therapeutic Hot Pool.*

During the 1948 epidemic considerable difficulty and delay was experienced in obtaining the equipment necessary for satisfactory physiotherapy and rehabilitation. Orders for materials and apparatus were placed through normal Departmental channels, but despite much goodwill and effort, deliveries were far from satisfactory.

With this experience in mind unusual authority was sought and obtained to secure materials on an " ad hoc " basis as and where procurable. In 1948 we did not have the benefit of an established splint shop staffed by skilled individuals and provided with ample facilities. At the time of the 1954 epidemic this splint shop was established and in full operation. The entire responsibility for the construction of all equipment and apparatus necessary at the Infectious Diseases Hospital and elsewhere, was therefore placed with the splint shop ; and those in immediate authority were advised that they could employ additional staff at their discretion. The result was that virtually all the special equipment that was necessary to cope with the epidemic was constructed and delivered within a matter of three to four weeks, an achievement of which any commercial undertaking might well be proud. The outcome has been that the after-care centre at the Infectious Diseases Hospital now ranks with any in Australia and above most and the rehabilitation of persons physically handicapped from poliomyelitis and other causes has been made far easier.

Hydro-therapy has always played an important part in the treatment and rehabilitation of persons physically handicapped from poliomyelitis or other causes. The lack of suitable facilities was emphasised in 1948 and a number of possibilities were unsuccessfully explored. Among the alternatives considered was the conversion of the Nedlands Hot Pool, the utilisation of a hot spring at the Claremont Mental Hospital and construction of a special pool at the Infectious Diseases Hospital. For various reasons nothing came of any of these proposals.

Early in the epidemic the need for a therapeutic hot pool primarily for poliomyelitis was recognised by the Department and underlined by the State Poliomyelitis Committee which recommended the provision of a pool by the Government as a matter of urgency. It is gratifying to record that the Government immediately approved the expenditure of £16,000 on the construction of a pool at the Infectious Diseases Hospital. This pool has been modelled on the lines of one which exists at Frankston in Victoria ; and it will be equipped with special apparatus for chlorinating the water and heating it. In addition, it will be provided with a mechanical device for raising and lowering patients who are severely disabled.

(8) *State Poliomyelitis Advisory Committee.*

The Committee was organised in 1938 to advise the Government in connection with the outbreak that occurred at that time. It was reconstituted in 1948 and rendered valuable service during the epidemic in that year.

It was reconvened on the 11th February, 1954, when the first meeting was held in connection with the epidemic which is the subject of this report. This Committee consists of some 15 members representing specialist physicians, orthopaedic surgeons, the Medical Superintendents of the major metropolitan hospitals, and a number of other experts concerned in one way or another with poliomyelitis. The service they have given has been in an honorary capacity and without thought of the considerable personal inconvenience which attendance at the several late meetings has involved.

The following were members of this Committee :—

Dr. B. A. Hunt	Physician.
Dr. J. G. Hislop	Physician.
Dr. I. O. Thorburn	Physician.
Dr. R. H. Crisp	Paediatrician.
Dr. R. D. McKellar-Hall	Orthopaedic Surgeon.
Dr. A. L. Dawkins	Orthopaedic Surgeon.
Dr. H. M. Hill	Orthopaedic Surgeon.
Dr. W. N. Gilmour	Orthopaedic Surgeon.
Dr. R. R. Anderson	Medical Superintendent, Royal Perth Hospital.
Dr. R. C. Godfrey	Medical Superintendent, Princess Margaret Hospital.
Dr. H. J. Rowe	Medical Superintendent, Fremantle Hospital.
Dr. E. J. Green	Ear, Nose and Throat Surgeon.
Dr. C. W. Anderson	General Practitioner.
Dr. N. R. Crosby	University of Western Australia.
Dr. E. G. Saint	Director, Clinical Research Unit, Royal Perth Hospital.
Dr. L. Henzell	Commissioner of Public Health (Public Health Department).
Dr. W. S. Davidson	Public Health Department.
Dr. D. J. R. Snow	Public Health Department.

This Committee met on three occasions during the epidemic (11th February, 4th March, and 8th April) and passed some 20 resolutions dealing with all aspects of the epidemic.

At its first meeting the plans prepared by the Department for dealing with the situation were set before the Committee and approved by it, and the following resolutions were passed :—

(1) That the special form of notification recommended by the Sydney Committee be adopted by Western Australia subject to minor amendments.

(2) That a draft statement for publication in the press be prepared within the Department and circulated to all members for approval prior to release to the newspapers.

(3) That Dr. Godfrey be requested to explore the possibility of the Hospital Board arranging for the accommodation of children suffering from acute poliomyelitis at Princess Margaret Hospital.

(4) That a working committee consisting of Drs. Snow, Anderson, Godfrey, Dawkins, and Gilmour be appointed to make recommendations in respect of—

    (i) accommodation for after-care cases ;
    (ii) an orthopaedic supervisory service ;
    (iii) domiciliary physiotherapy facilities ;
    (iv) equipment.

(5) That the Government urgently take the necessary steps for the provision of a swimming pool for cases of poliomyelitis.

(6) That in the event of an epidemic being proclaimed the Commissioner of Public Health be specially authorised to appoint paid medical staff for the duration of the emergency.

(7) That the Medical Superintendent, Royal Perth Hospital, be authorised to appoint physiotherapists to the Infectious Diseases Hospital at his discretion.

(8) That Dr. Dawkins be requested to prepare a list of all equipment urgently required and that arrangements be made by the Department for the supply of this equipment with all possible speed.

At the second meeting on the 4th March, the following resolutions were passed :—

(9) That the provision of additional permanent accommodation at Infectuous Diseases Branch is a matter of very great urgency, especially in view of the fact that by August, pressure on accommodation at the Royal Perth Hospital will be critical.

(10) That because of risks of the intermingling of different school groups, fatigue, and inadequate sanitary facilities, the decision to abandon the Claremont Review in favour of some alternative is supported by this Council.

(11) In view of the possibility that the transference of poliomyelitis virus to Her Majesty the Queen by the shaking of hands cannot be excluded, this Council is of the opinion that hand shaking should be avoided during the Royal Visit.

(12) In view of the past experiences of the effect on crowds during polio epidemics, it is the opinion of this Council that an increase in the number of cases may be anticipated as a direct result of the Royal Visit ; but that the magnitude of this increase would be minimised if the precautions advised by this Council are conscientiously observed by all concerned.

(13) That an orthopaedic service staffed by a Director, four orthopaedic surgeons and the necessary auxiliary personnel be inaugurated in order that an organisation might be developed to ensure that all polio cases were restored to a maximum degree of independence.

(14) That the services of consultants employed by the State in handling the polio epidemic be remunerated at the rate of £3 3s. an hour and that the Director of orthopaedic services receive an honorarium.

(15) That this Council advise the State Government that in view of the national aspect of this affliction, payment for medical and hospital services and pensions should be met by the Commonwealth Government on a basis similar to that for tuberculosis, bearing in mind the services of general practitioners and consultants.

(16) That the establishment of a virus diagnostic unit under the auspices of the Public Health Department is an urgent and imperative need in this State.

At the third meeting of 8th April (immediately after the departure of the Royal Party) the following resolutions were passed :—

(17) That the minutes of the previous meeting be confirmed with the exception of Resolution 12, which should lapse because of a misunderstanding.

(18) That Dr. R. R. Anderson be requested to reconsider his resignation from the Committee.

(19) That this Council wishes to place on record its appreciation of the prompt action taken by the Government in authorising the construction of a therapeutic hot pool at the Infectious Diseases Hospital.

(20) That this Committee requests the Commissioner to advise the resumption of immunisations as soon as this can be done with safety.

It would be fitting to record here a tribute to the valuable assistance rendered by the Committee at all stages of the epidemic.

(9) *National Health and Medical Research Council : Poliomyelitis Committee.*

This Committee met in Perth from the 10th to the 12th March, inclusive. It was its third meeting ; the first having been held in Adelaide in February, 1952, and the second in Sydney in September, 1953.

As the meeting was convened at very short notice, New South Wales and Queensland were unable to arrange representation. The following attended :—

Dr. C. E. Cook	Senior Medical Officer, Commonwealth Health Department (Chairman).
Dr. B. P. McCloskey	Poliomyelitis Division, Victorian Health Department.
Dr. H. M. L. Murray	Director, Public Health, Tasmania.
Dr. D. J. R. Snow	Epidemiologist, Western Australia.

Co-opted :

Dr. H. McLorinan	Medical Superintendent, Fairfield Infectious Diseases Hospital, Melbourne.
Dr. J. A. R. Miles	Research Fellow, Medical and Veterinary Research Institute, Adelaide.
Dr. A. Ferris	Epidemiological Research Unit, Melbourne.

The Committee discussed all aspects of the Western Australian epidemic, inspected all establishments connected with polio and passed the following resolutions :—

(1) The Committee commends the research programme undertaken by the West Australian Department of Public Health from the inception of the current epidemic.

The promptitude with which it was commenced and the broad field embraced, promises to furnish information regarding the virological, epidemiological and clinical features of the epidemic which will prove of considerable value not only to the Department itself, but to Health authorities in other States.

The Committee considers that the West Australian study might well serve as a model for adoption in other States during epidemics.

(2) The Committee commends the action taken by the West Australian Department of Public Health to initiate a system of home nursing for cases of polio and approves the method adopted, subject to certain suggestions :—The Committee recommends that this system of home nursing might be supplemented by arranging for relatives to visit a child patient under suitably controlled conditions where nursing of juveniles must be undertaken in a hosptial.

(3) Recent West Australian experience emphasises the importance and urgency of special virological investigations in the precise diagnosis of conditions such as " aseptic meningitis " and the relationship of these conditions to polio ; and this Committee recommends that further financial assistance be provided by the Commonwealth for an expansion of facilities at existing virus reference laboratories and for the establishment of virus diagnostic units in States where at present these do not exist.

(4) The Committee concurs in the Commonwealth proposal that 10 per cent. of the output of gammaglobulin should be reserved for use against infective hepatitis.

(5) The Committee is of the opinion that :—

(a) A safe and effective polio vaccine of the inactivated type is likely to be available soon.

(b) As such a vaccine is at present being mass produced in America under the supervision of Dr. Bazeley, a Medical Officer of the Commonwealth Serum Laboratories who is returning to Australia shortly, there would appear to be no technical reason why its mass production should not be commenced by him in Australia on his return.

The Committee therefore recommends that the Commonwealth as an urgent measure, establish and equip a Laboratory for the mass production of poliomyelitis vaccine for the immunisation of the people of Australia and its dependencies. The objective should be to produce bulk supplies of a Salk type vaccine within twelve months.

(6) The Committee is of the opinion that the alterations to the Royal Tour plans proposed by the Royal Tour authorities would materially reduce the risk to school children. It recommends that in addition parents be advised to protect children of pre-school age from unaccustomed contacts, unusual sources of food and undue fatigue.

(7) The Committee is of the opinion that the following measures will reduce the exposure of Her Majesty the Queen and His Royal Highness the Duke of Edinburgh to polio infection during and as a result of their visit to Western Australia :—

(a) The shaking of hands with Her Majesty and with His Royal Highness and the presentation of loyal addresses and bouquets should be discouraged.

(b) The special precautions proposed by the West Australian Department of Public Health should be applied in respect of persons preparing and handling food for the Royal Party ;

(c) The arrival of " Gothic " should be delayed as long as possible and contact of the ship's company with the shore should be reduced to a minimum. In addition, it is desirable that " Gothic " be fully provisioned prior to departure for Western Australia.

(8) The Committee is of the opinion that Her Majesty should not be subjected to undue fatigue.

(9) The Committee recommends that the Weekly Return of Notifications supplied by the States to the Commonwealth Department of Health be furnished in accordance with the pro forma attached.

The deliberations and recommendations of this Committee were of the greatest value to the State during this period of high stress.

Advantage was taken of the presence of two members with unrivalled experience in certain fields of polio, by arranging for them to address the medical profession on two subjects considered likely to be of the greatest profit to them. Dr. McLorinan spoke at a lunch hour meeting at the Royal Perth Hospital on March 10th on " Poliomyelitis and the General Practitioner," (Symptomology and Differential Diagnosis of the Preparalytic Phase). Incidentally this well-known doctor also addressed the Perth Rotary Club and did a very great deal to allay the panic which was then at its height. Dr. McCloskey, the discoverer of post-inoculation poliomyelitis addressed a well-attended medical meeting on 11th March on the subject of " Factors predisposing to paralysis in poliomyelitis with special reference to inoculations." Both lectures were well received by the West Australian medical profession and stimulated keen discussion.

(10) *Implications of the Royal Visit.*

During the 1948 epidemic there were indications that crowds and unaccustomed personal contacts had some adverse influence on the trend of the infection rate. Thus the Royal Agricultural Show which recorded an attendance of 153,713 over a period of four days, was followed a fortnight later by an upsurge of incidence amounting to some 20 additional cases. The attendance on the main day " People's Day " was 65,641 ; while that on " Children's Day " was 26,551. Further, during the course of that epidemic, schools were closed for three appreciable holiday periods. On each occasion about a fortnight after school closure, there was a small burst of infections which interrupted the general trend of the epidemic. These additional cases were attributed to infections acquired by children from new playmates or new contacts.

In the light of current belief in an association between crowds and poliomyelitis and in view of previous local experience, some increase attributable to the Royal Visit was therefore expected. The extent of this increase could not be predicted, but the general feeling was that it should be minimised by special precautions in regard to children.

Further, there was anxiety lest a member of the Royal Party acquire the infection while in the State, or that a member of the crew of " Gothic " become infected and convey the infection to others on board the vessel whilst at sea on the return trip.

So far as the Royal Party was concerned, it was considered the following special precautions would minimise the risk of infection :—

(1) There should be no hand shaking.

(2) Meals prepared for and served to the Royal Party should be made the responsibility of as few as possible and those concerned should be subjected to medical examination and to certain laboratory tests to ensure freedom from infection.

(3) The advisability of recommending injections of gammaglobulin for members of the Royal Party was considered.

(4) It was proposed that no shore leave be permitted the members of the " Gothic " and that the vessel be fully provisioned and watered prior to its departure from Adelaide so that it would not be necessary to take on stores or water in Western Australia.

It transpired that this aspect of the problem was virtually taken out of the hands of the State Administration and became the subject of a special conference in Adelaide, attended by members of the Royal Household, Federal representatives and the Commissioner of Public Health and the State Director of the Royal Tour (representing Western Australia). The outcome was that drastic alterations were made in the original arrangements insofar as they affected the Royal Party. The proposed State arrangements for their protection were therefore rendered unnecessary.

So far as the West Australian public was concerned, special attention was paid to children and the following alterations were made in the Royal Visit arrangements :—

(1) A special review of some 60,000 pre-school and school children within the Showground arena in Perth was cancelled. The children would have represented all ages from 3 to 15 years. They would have come from a large number of schools and kindergartens and and from many different areas, some of which had been free from polio. It would have been extremely difficult to eliminate all contact between individual groups. Toilet facilities would have been severely taxed ; and finally, the children would have been required to stand in formation for at least two or three hours, and would thus be subjected to undue fatigue. The decision to cancel this review, which had been a highlight in the other States, caused much disappointment.

(2) As an alternative, a dispersal system of "strong-posts" was devised, whereby children were assembled in their own school groups along the main highways traversed by the Royal entourage. Wherever possible these posts were sited outside or near the large schools. Where it was necessary for children from more than one school to occupy a single post, a distance of ten yards separated each school group. Children were not required to stand about for longer than one hour. Each child was provided with an individual "health bag" containing a snack, a drink, a cake of soap, a small towel, and his or her own drinking vessel. They were under strict supervision by their own teachers.

(3) At the country centres visited by Her Majesty and the Duke of Edinburgh reviews of school children were organised. These were considered permissible because they involved far fewer children than had been envisaged in the mass gathering in Perth. Further, few country areas had at that time been involved in the epidemic, but in isolated instances schools in affected areas were excluded from the respective reviews. In any event, apart from the personal precautions indicated in the preceding paragraph, the utmost care was taken to keep school groups apart from one another. They were transported to the assembly areas in separate vehicles, directed to special temporary toilets and marched quickly to their allotted areas. Each operation was conducted with almost military precision and according to carefully prepared time-tables. As a result there was virtually no contact between the various groups.

It is surprising but gratifying to be able to record that the anticipated increase in the number of cases attributable to crowding during the Royal Visit, did not eventuate. The experience has been recorded in the Medical Journal of Australia ("Crowds and Poliomyelitis," 1st January, 1955); was referred to in a Lancet editorial, and requests for reprints of the article in question have been received from many parts of the world.

III. RESEARCH PROGRAMME.

The research programme, some aspects of which were planned in collaboration with Dr. J. A. R. Miles, involved laboratories in three other States, and was made possible through the good-will and co-operation of many people. It embraced six more or less distinct projects :—

1. *General Epidemiological Investigations.*

The data furnished by Medical Practitioners notifying cases, and by Health Inspectors reporting upon results of their house to house visits provided the basic information concerning the magnitude and quality of the epidemic, the geographical distribution, age selection, the sex incidence, the ratio of paralytic to non-paralytic cases, familiar incidence, contact associations, and a host of other particulars which are relevant to the general problem of epidemic poliomyelitis. The main purpose was of course to search for clues likely to be of assistance in interrupting transmission from person to person and generally curtailing spread as far as was possible.

2. *Isolation of the Virus Responsible for the Epidemic.*

Owing to the lack of virus diagnostic facilities in this State, the assistance of the Adelaide Medical and Veterinary Research Institute was sought and obtained, and Dr. J. A. R. Miles very kindly undertook to examine 10 faecal specimens from representative patients suffering from the paralytic form of the disease. These specimens were duly obtained, packed in dry ice and flown to Adelaide. Subsequent examination revealed the presence of Brunhilde (or Type I) poliomyelitis virus in nine of the 10 specimens tested. These isolations were of the greatest interest as they gave the clearest indication of the nature of the virus responsible for the epidemic, and constituted the first virus isolations ever organised in Western Australia.

3. *Serological Evidence of Silent Immunising Infections.*

It is of course well known that immunity may follow symptomless and non-paralytic infections with poliomyelitis virus ; but it was thought worthwhile to obtain serological evidence of the development of immunity in a semi-closed child community such as a school, in which one or more cases of typical poliomyelitis had occurred. It was planned to take 150 blood specimens from children in all age groups within the school on three occasions at intervals of three months ; while at the same time maintaining an accurate health record of all pupils within the school. The Como State School presented the first opportunity for this investigation and Dr. Miles undertook to have the specimens examined in his laboratory.

It was also arranged that fortnightly specimens would be obtained from the septic tank of the school in question and sent in dry ice to Adelaide for virus isolation. The very first of these specimens disclosed the presence of Brunhilde (or Type I) poliomyelitis virus, but several subsequent specimens were negative.

The entire investigation has been reported in detail in the Medical Journal of Australia "Immunity to Poliomyelitis" (September 24, 1955). It suggested that 47 per cent. of children at Como School were immune to poliomyelitis but no change in this proportion occurred during the succeeding period of five months.

4. *The General Level of Immunity in the Adult Population.*

The assistance of Dr. N. F. Stanley of the Institute of Epidemiological and Preventive Medicine, Prince Henry Hospital, Sydney, was secured in testing pools of sera abstracted from blood donations made at the Red Cross Blood Transfusion Unit for general purposes. These pools were arranged in the various five-year age groups from 20 to 40 and were submitted to neutralisation tests using mice inoculated intracerebrally with Type I poliomyelitis virus and to anti-body estimations in tissue culture using all three anti-genic types of virus.

The composition of the serum pools were as follows :—

20 to 24 years	238 donors.
25 to 29	159 donors.
30 to 34	118 donors.
35 to 39	101 donors.
Total	616 donors.

The results were as follow :—

Neutralisation tests (50% *end point titre*).

20 to 24 years	1/12
25 to 29 years	1/42
30 to 34 years	1/90
35 to 39 years	1/70

Anti-body estimations.

	(i)	(ii)	(iii)
20 to 24 years	1/40	1/160	1/10
25 to 29 years	1/20	1/200	1/20
30 to 34 years	1/80	1/160	1/20
35 to 39 years	1/160	1/160	1/10

These findings indicated a reasonably high level of immunity to Type I poliomyelitis in the older age groups but a relatively low level of immunity in the 20–24 age group. While being of some general interest this investigation was, however, of limited value and although successive examinations at regular intervals throughout the epidemic may have been of greater interest, these could not be organised because of the difficulty of securing an adequate number of donors.

5. *Clinical Investigation of Poliomyelitis-like Syndromes.*

At the outset of the epidemic, reports were received from several Doctors suggesting the existence of bizarre syndromes resembling non-paralytic poliomyelitis but associated with sensory manifestations. Dr. E. G. Saint readily agreed to admit a few of these cases to his Clinical Research Unit for thorough investigation with a view to determining whether they were due to poliomyelitis or some other virus infection prevailing concurrently with poliomyelitis.

Few doctors availed themselves of the special facilities made available, but those cases which were referred to the unit were most carefully investigated and led to the following conclusion :—

> " There is no reason to suppose that the symtomatology of poliomyelitis in the present epidemic is in any way different from that on previous occasions in this and other States. We have not seen a case with sensory change or with herpetic lesions in the mouth. The important impression we have gained is that of the overwhelming fear and anxiety on the part of the patient with any mild non-specific fever, and one wonders if early cases with paraethesias are not manifesting mild hysterical signs."

6. *Attempted Isolation of Virus from Milk, Water and Sludge.*

Through the courtesy of Dr. A. A. Ferris of the Epidemiological Research Unit, Fairfield Hospital, Melbourne, the following specimens were examined with negative result for the presence of poliomyelitis virus :—

(1) Specimens of milk from the intake pipe at the largest metropolitan dairy.

(2) Filter pads at the outlet of a water pipe at the Public Health Laboratory.

(3) Specimens of sludge from the main metropolitan sewage plant.

7. *Gamma-Globulin.*

At the outset of the epidemic a small stock of gamma-globulin was sought and obtained from the Commonwealth Serum Laboratories, Melbourne, for use as an attempted prophylactic against poliomyelitis. It was obvious that its use would need to be restricted to certain special categories, but the public demand for even this uncertain prophylactic was pressing to the point of embarrassment, and it became necessary to release a series of press statements stressing the limitations and uncertainty of gamma-globulin as a prophylactic against poliomyelitis and the difficulties of obtaining stocks sufficient for more than a few cases.

Meanwhile the use of this substance and the manner whereby it could be distributed with greatest profit was placed on the agenda of the National Poliomyelitis Committee meeting, which ultimately resolved that the highest priority group in which gamma-globulin was indicated included the following categories in order of importance :—

(1) Pregnant women who are contacts.

(2) Babies born of pregnant women who are suffering from acute poliomyelitis.

(3) Children who require urgent E.N.T. and dental operations during an epidemic.

(4) The following persons to whom an intra-muscular injection requires to be given :
  (a) Household contacts ;
  (b) Intimate child contacts ;
  (c) Other special cases at the discretion of the Health Department.

These recommendations were made known to the medical profession in the form of a circular and the policy of the Department in regard to the use and distribution of the limited quantity of gamma-globulin available at the time is indicated in the following abstract taken from the circular :—

> " The value of gamma-globulin as a prophylactic agent against poliomyelitis has not been established beyond all reasonable doubt. Furthermore, supplies are extremely limited and replenishment is uncertain. For these reasons the use of gamma-globulin should be regarded mainly as a research project and its issue should be restricted to the categories indicated, which are considered to be at special risk . . . . . The object of gamma-globulin is prevention and not mitigation (which is uncertain). Gamma-globulin is relatively useless if given later than four days after exposure to infection, or of onset in the index case . . . . . "

The number of patients qualifying for the use of gamma-globulin according to the criteria adopted was surprisingly small. It was asked for in only 12 cases and in each case the contents of one ampoule of 5 c.c. was injected.

The 12 cases were made up as follows :—

Two pregnant women who were contacts ;

One baby born of a pregnant woman whose husband was suffering from acute poliomyelitis at the time ;

Six children upon whom urgent E.N.T. or dental procedures were performed ;

Three household contacts in a Doctor's family.

All these cases were followed up for 14 days ; special note being taken of the following symptoms—headache, fever, vomiting, sore throat, back or neck pain and muscle weakness. Three out of the 12 injected showed untoward symptoms at some period during the 14 days. One was a child aged five who had some teeth extracted and eight days later developed headache, fever and pains in the lower limbs which lasted for 24–48 hours.

Two others were intimate child contacts in a doctor's family where a case of poliomyelitis had occurred. These two children developed headache, fever, vomiting and back pain three days after injection, but returned to normal health within a day or two.

Owing to the small series of cases tested, it was not possible to assess the value or otherwise of gamma-globulin under the circumstances in which it was used, but it certainly brought much psychological comfort to the parents of the children injected.

IV. EPIDEMIOLOGY.

Monthly Incidence.

The accompanying histogram of notifications recorded each month (Fig. 2) shows a swift rise during February, the peak in March, and a steady fall during the next few months. This seasonal pattern is typical of poliomyelitis epidemics elsewhere and is quite unlike the winter epidemic experienced in 1948.

POLIOMYELITIS, W.A. – 1954 EPIDEMIC BY MONTHS.

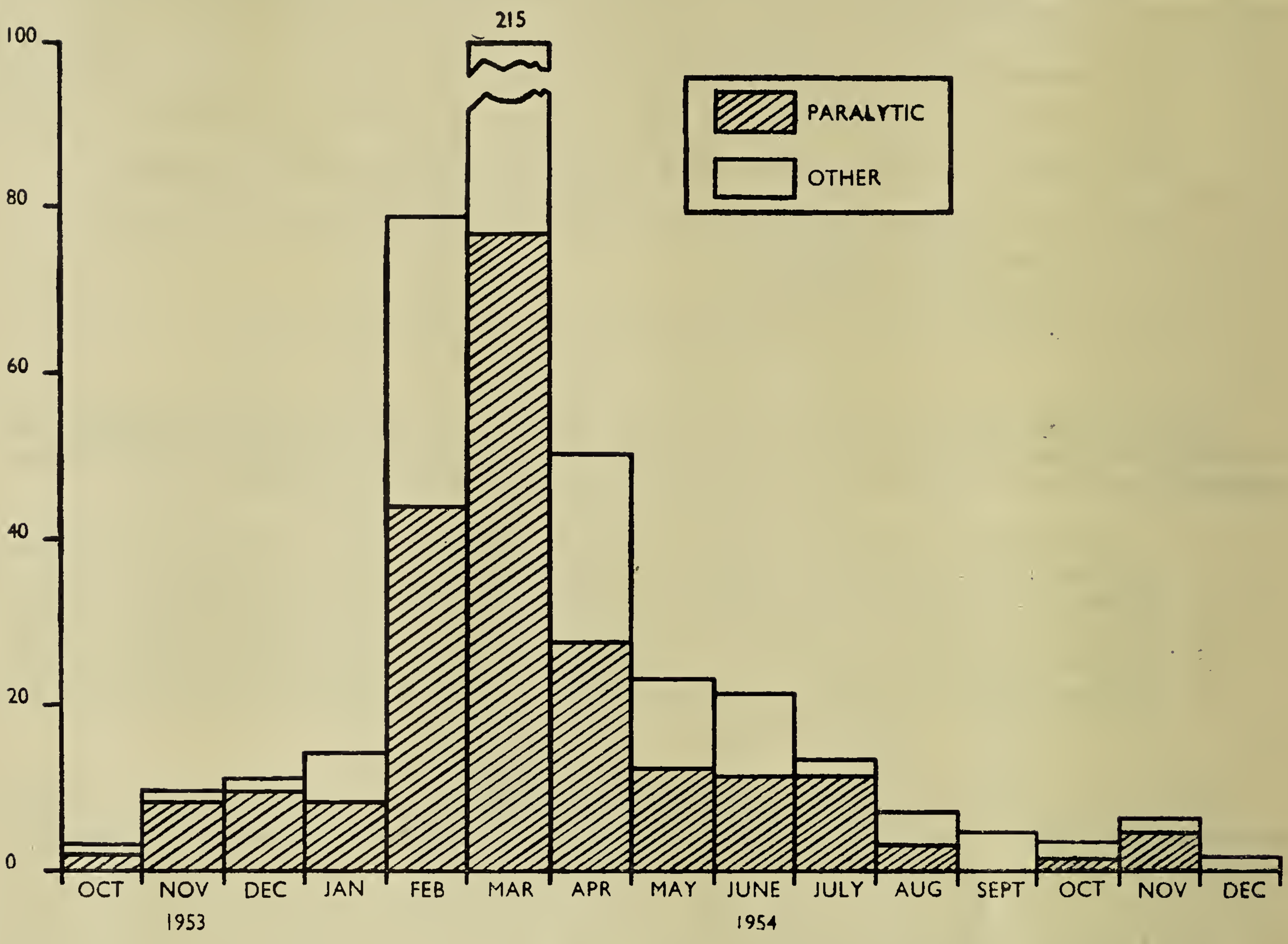

FIGURE II.

Age Incidence.

During the 1948 epidemic, the largest number of cases occurred in the 5–9 age group (81 or 26 per cent.) and in the 0–4 age group (64 or 20 per cent.). These two groups accounted for nearly half of the entire total. So far as individual years were concerned, incidence was maximal in the 5th and 6th years (24 and 19 cases respectively). The percentage breakdown was as follows :—

Age Group.	Notifications.	Proportion. %
0– 4 years	64	20·6
5– 9 ,, ...	81	26·1
10–14 ,, ...	48	15·4
15–19 ,, ...	38	12·2
20–24 ,, ...	32	10·3
25–29 ,, ...	17	5·5
30–34 ,, ...	15	4·8
35–39 ,, ...	9	2·9
40–44 ,, ...	6	1·9
45–49 ,, ...	0	0 0
50–54 ,, ...	1	0·3
All ages	311	100·0

The age distribution during the 1954 epidemic showed a slight shift to the left, *i.e.*, younger age groups were relatively more heavily attacked and the heaviest incidence was in the 0–4 age group (104 cases). The percentage distribution was as follows :—

Age Group.	Notifications.	Proportion. %
0– 4 years	104	23·9
5– 9 ,,	62	14·2
10–14 ,,	44	10·1
15–19 ,,	42	9·6
20–24 ,,	42	9·6
25–29 ,,	44	10·1
30–34 ,,	50	11·5
35–39 ,,	18	4·1
40–44 ,,	17	3·9
45–49 ,,	5	1·2
50–54 ,,	8	1·8
All ages	436	100·0

Manner of Spread—Geographical Distribution.

As had been done in 1948, a " spot map " of the epidemic was maintained from the onset (Fig. 3). It is interesting to recall that the technique of the spot map in epidemiology was devised by John Snow (1813–1859), who by this means was able to incriminate the notorious Broad Street Pump as being responsible for an outbreak of cholera in 1854. This simple device, despite the lapse of nearly a century, still retains a useful place in epidemiological investigation.

SERIAL SPOT MAPS OF THE TWO POLIOMYELITIS EPIDEMICS IN PERTH, WESTERN AUSTRALIA.

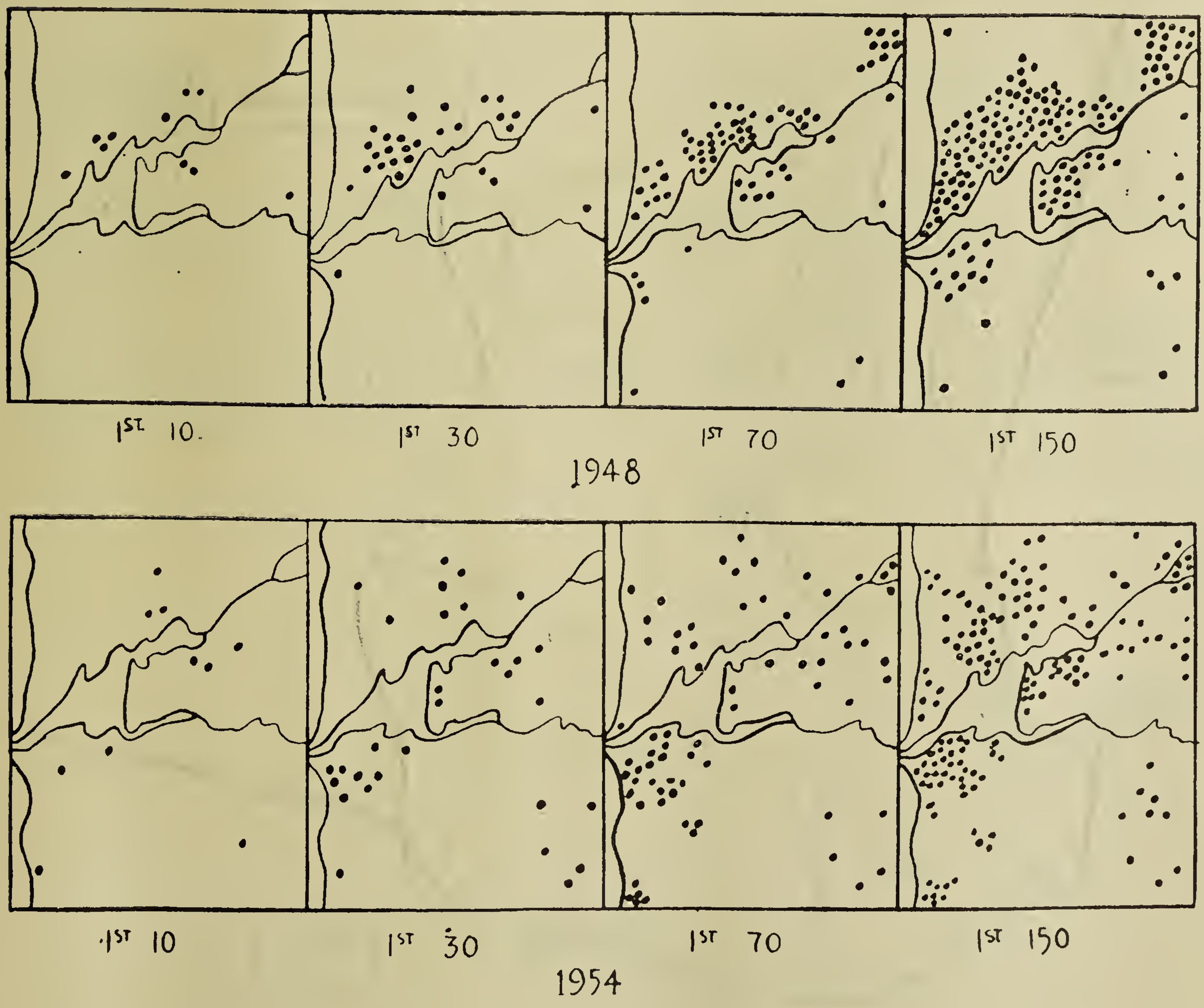

FIGURE III.

In 1948, the spot map assisted in revealing the " march " or direction of spread of consecutive cases notified. A series of spot maps were prepared for the metropolitan area and notifications were plotted in progressive sequence according to the formula a + 2n, where " a " was an arbitrary number (10) and " n " the preceding number in the series. In such a series (a + 2n), where a = 10, the sequence would be 10, 10 + (2 × 10) or 30, 10 + (2 × 30) or 70, and 10 + (2 × 70) or 150. In other words, the first spot map in the series represents the first 10 cases in the epidemic, the second map shows 30 cases (including the first 10), the third 70 cases (including the first 30) and so on until the total number of recorded cases is exhausted. This expedient is useful in obtaining a progressive picture of the pattern of spread and might be expected to reveal selective lines of dissemination when these exist.

The conjoined area of Perth-Fremantle is conveniently divided by the Swan River into Northern and Southern parts. The 1948 epidemic appeared to commence North of the river, progressed rapidly in that sector and maintained its preponderance there throughout ; further, a few fairly well-defined clusters were noticeable on the spot maps. The Southern sector was involved very late in the epidemic, and then only sparsely. " The direction of spread was general rather than specific " and the concentration of cases appeared to be related to local population density.

The 1954 epidemic on the other hand seemed to develop South of the River and spread fast in that sector. The Northern districts however, soon became involved, but were not as heavily affected as they were in 1948. Again, occasional groups of cases were discernible on the spot map at various stages, but eventually became obscured as more and more cases were plotted. Finally, no special selective pathway was apparent.

The general impression conveyed during a study of these spot maps was that the epidemic developed in and mainly involved that area which was least affected in 1948, while the region worse affected in 1948 suffered least in 1954. This observation is of special interest because it is consistent with a fundamental principle in epidemiology, *i.e.*, that the pattern of any outbreak of infectious disease is determined by the balance between susceptibility and immunity. In other words, substantial immunity would have persisted in areas heavily involved in 1948, and it was to be expected that these areas would be lightly involved in 1954.

The spot map for the rest of the State (Fig. 4) supports the same conclusion.

SERIAL SPOT MAP OF THE TWO POLIOMYELITIS EPIDEMICS IN PERTH, WESTERN AUSTRALIA (EXCLUDING PERTH).

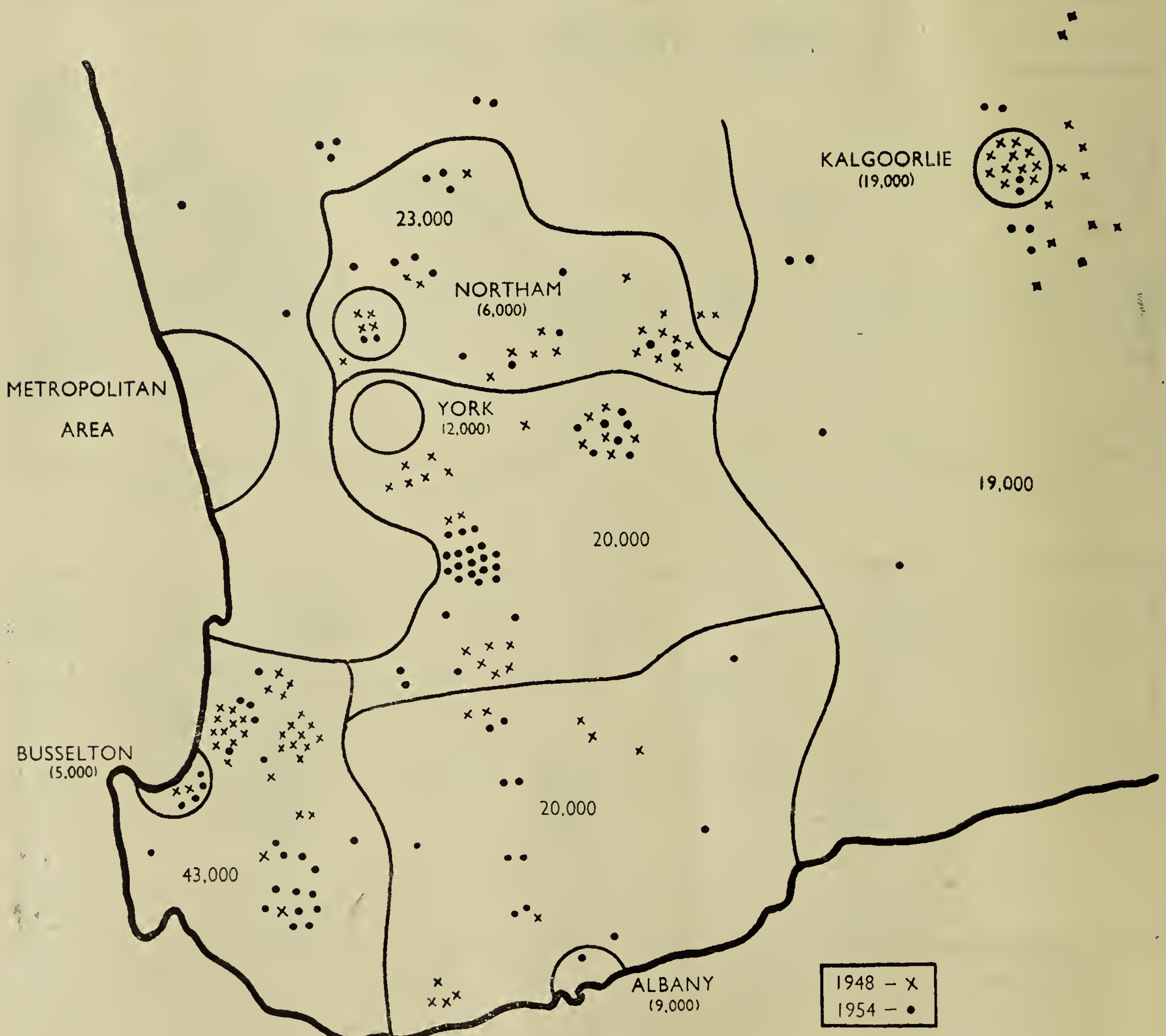

FIGURE IV.

From the evidence of the spot maps, and from the general epidemiological enquiries pursued, there were no indications of any common source of infection such as food, milk or water. Contact histories were few, but impressive, and the overall impression left was that of spread by personal contact.

Meteorological Association.

It will be recalled that an extraordinary close relationship was detected during the 1948 epidemic between incidence of the disease on the one hand and atmospheric temperature, humidity and barometric pressure on the other. At that time it was realised that the climatic relationship might well have been fortuitous, but further investigations were contemplated when circumstances permitted. Subsequent investigations in regard to the other Australian capital cities proved inconclusive, and were published in the Medical Journal of Australia ("Poliomyelitis and Atmospheric Conditions in Certain Australian Cities," July 5th, 1952). An extended English investigation undertaken subsequently by the Ministry of Health was also inconclusive.

The closest watch was nevertheless maintained on the meteorological readings during the 1954 epidemic, but no significant influence upon the incidence of the disease could be detected.

After careful consideration of this and previous experiences, it would appear that the pursuit of this line of enquiry is unlikely to be profitable, and that an explanation for the genesis, course and termination of poliomyelitis epidemics must be sought elsewhere.

In the light of the growing volume of evidence incriminating the transference of particulate faeces as being the major mechanism in the spread of poliomyelitis, and of the overwhelming importance of close contact, it would appear that the main influence of climate on epidemics might well be exerted indirectly through an alteration in the social habits of the community at risk.

V. THE AFTERMATH AND A COMPARISON WITH 1948.

A statistical analysis of the 1948 epidemic (which involved 311 notifications) disclosed that over 90 per cent. of all cases were paralytic while the remaining 10 per cent. was non-paralytic ; eight out of each 100 cases died ; nine others were left handicapped and dependent on other people for assistance ; 17 were left handicapped to a moderate degree but were capable of leading adjusted lives without hardship ; while the remaining 66 recovered without any paralysis whatsoever or with weaknesses of a trivial nature.

During 1954 (which accounted for 436 cases) only 45 per cent. of cases were paralytic ; 48 per cent. were non-paralytic ; and in the remaining 7 per cent. the type of disease was not specified. Only one out of each 100 died, and it is estimated that only three will be left severely handicapped and six moderately handicapped, while 90 per cent. will have recovered completely or with only the most trivial weaknesses.

The contrast therefore is most striking, for despite a considerably larger number of infections recorded during 1954, the mortality and residual disability accruing on a proportionate basis is very much less than the 1948 experience gave reason to expect. The killing and crippling power of it was far less than during the previous epidemic, despite the fact that the virus involved is a notorious paralysis producer.

An explanation for this difference has been offered elsewhere in the Report but it may be reiterated that by heeding the Department's advice, by seeking early medical attention, by avoiding fatigue, and by observing the other precautions recommended, the people of Perth curtailed both the quantity and quality of the damage that might otherwise have resulted from the epidemic ; and a number of lives were probably saved.

D. J. R. SNOW, M.R.C.S., L.R.C.P., D.P.H.

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Appendix IX.

REPORT FROM DR. D. S. MACKENZIE OF THE V.D. SECTION.

To the Commissioner of Public Health.

It is with a feeling of satisfaction—but of some frustration—that I write my report on the work of the V.D. Department for the year 1954. Satisfaction that the Department has done good work and the treatment of the patients has been quite successful. Frustration because we are only treating a fraction of the infected cases. We are doing little if anything to bring down the incidence of V.D. and its after effects.

I am of the opinion that a large number of cases are getting little treatment and that there is a considerable amount of treatment given by unqualified practitioners. Unfortunately, perhaps, the use of antibiotics has made the treatment too simple and too short. Again, the signs and symptoms of gonorrhoea have changed radically in the last decade. Seldom do we get a case of acute strangury and discharge even if untreated tends to diminish relatively early. Perhaps this is a result of the almost universal use of antibiotics for almost any condition. However, cases coming from the North and from the East Indies and overseas still present the classical signs.

I have kept a rough census of the cases as they come in and the results are rather enlightening. Twenty-five per cent. come from contact with professionals, 40 per cent. from hotel lounges and street pick-ups, the other 35 per cent. from dances, barbecues and friends. The professional looks after herself to a degree the others are ignorant of or do not care.

The cases of syphilis have almost all come from contact with professionals.

Very few women attend the Clinic and I am afraid few of those infected, if they do seek treatment, receive adequate treatment.

It is very difficult to catch those infected women and, if caught, they go to a private doctor, carefully attending to their personal hygiene before doing so. The result is most frequently a negative smear and a clean sheet for the woman.

I feel convinced that we will have to adopt a different approach to V.D. as a whole. An open and public campaign has given us results in dealing with tuberculosis. A similar crusade would, I feel sure, succeed against V.D.

Better facilities should be made available. The " Caves " at Royal Perth Hospital are most unsuitable—cold in winter, hot and unventilated during the summer. Approach to the area is depressing in the extreme. I hope that the Department in the New Wing will be made as attractive as any clinic in the hospital.

No radical changes in treatment have been instituted. The so-called condition of Non-Specific Urethritis is still unconquered. Terramycin gives some results, but the causative organism, most frequently a Haemolytic Streptococcus, is most resistant.

In conclusion, it is my opinion that only close co-operation with laboratory work and clinical work can improve the curative side of diseases due to sexual intercourse.

Appendix X.

VENEREAL DISEASE IN WESTERN AUSTRALIA.

1953–1954.

	Male.		Female.		Total.	
	1953.	1954.	1953.	1954.	1953.	1954.
Syphilis—						
Primary	15	2	2	1	17	3
Secondary	5	4	4	5	9	9
Tertiary	11	5	6	2	17	7
Congenital	....	....	....	2	....	2
Total, Syphilis	31	11	12	10	43	21
Gonorrhoea	175	171	14	17	189	188
Chancroid	1	2	....	....	1	2
Granuloma*	2	....	....	1	2	1
Total	209	184	26	28	235	212

* Native.

Appendix XI.

DERBY LEPROSARIUM.

Admissions and Discharges for the Year 1954, compiled from Monthly Returns of the Superintendent.

Month.	Admissions.							Discharges.											Inmates Remaining in Leprosarium.		
	Males.			Females.			Total Admitted.	Males.					Females.					Total Discharged.	Males.	Females.	Total Remaining.
	Admitted.	Re-admitted.	Total Males.	Admitted.	Re-admitted.	Total Females.		Discharged Cured.	Deceased.	Absconded.	Discharged Non-infectious.	Total Males Discharged.	Discharged Cured.	Deceased.	Absconded.	Discharged Non-infectious.	Total Females Discharged.				
January	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	167	95	262
February	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	167	95	262
March	....	....	....	....	....	....	....	7	1	....	....	8	7	1	....	....	8	16	159	87	246
April	2	....	2	1	....	1	3	....	....	....	....	....	....	1	....	....	1	1	161	87	248
May	2	....	2	....	....	....	2	6	....	....	....	6	....	....	....	....	....	6	157	87	244
June	8	1	9	2	1	3	12	1	1	....	....	2	4	1	....	....	5	7	164	85	249
July	5	2	7	3	2	5	12	....	....	....	....	....	....	....	....	....	....	....	171	90	261
August	1	....	1	....	....	....	1	7	2	....	....	9	7	....	....	....	7	16	163	83	246
September	4	2	6	2	2	4	10	4	3	1	....	8	3	....	....	....	3	11	161	84	245
October	2	1	3	1	....	1	4	2	3	....	....	5	....	....	....	....	....	5	159	85	244
November	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	1	158	85	243
December	1	....	1	2	1	3	4	....	1	....	....	1	....	....	....	....	....	1	158	88	246
Total	25	6	31	11	6	17	48	27	11	2	....	40	21	3	....	....	24	64	....	....	....

Analysis of Admissions and Discharges during Year 1954.

Inmates as at 31st December, 1953	262
Admissions for period ended 31st December, 1954	48
Discharges for period ended 31st December, 1954	48
Deaths for period ended 31st December, 1954	14
Absconded for period 31st December, 1954	2
Total remaining at Leprosarium, 31st December, 1954	246

Appendix XII.

THE HISTORY OF SOME COMMUNICABLE DISEASES IN WESTERN AUSTRALIA (1828–1951) PART IV.

By Dr. D. J. R. Snow.

The first part of this feature dealt with *smallpox* and *plague* (Annual Report for 1951) ; the second part with *diphtheria, scarlet fever, whooping cough* and *measles* (Annual Report for 1952) ; the third part with *influenza, typhoid fever* and *murine typhus* (Annual Report for 1953). The present instalment includes available data on *brucellosis* and *rubella.*

X. BRUCELLOSIS (1828–1954).

Incidence in Humans.

The earliest reference to brucellosis in the records of the Public Health Department is a statement made in a memorandum dated 19th April, 1937, to the effect that " There has, up to date, been no evidence to support the belief that undulant fever has occurred in humans in this State."

The disease was made notifiable on 23rd July, 1937, but there is no official record of its occurrence until 1943. Notifications since that time have been as follows :—

1943	4	1949	9
1944	3	1950	7
1945	5	1951	7
1946	6	1952	6
1947	9	1953	7
1948	5	1954	8

Throughout this period diagnosis was based on clinical manifestations, but in the majority of these cases the clinical diagnosis was supported by serological agglutination at significant titres. Attempted cultures have hitherto been unsuccessful and the precise type of brucella organism involved has not been identified but epidemiological and other evidence indicates that the sole type involved has been brucella abortus.

Of the 44 consecutive cases notified from 1949 to 1954, inclusive, occupations have been represented as follows :—

Farmers	7
Housewives	6
School children	6
Veterinarians	2
Servicemen	2
Nurses	2
Firemen	2
Slaughtermen	1
Miscellaneous	16

The age-grouping has been as follows :—

	Male.	Female.	Total.
0– 4	....	....	....
5– 9	2	1	3
10–14	2	....	2
15–19	1	2	3
20–24	3	....	3
25–29	3	3	6
30–34	3	....	3
35–39	3	1	4
40–44	7	2	9
45–49	4	....	4
50+	5	2	7
	33	11	44

The geographical distribution has been as follows :—

	Metropolitan.	Country.	Total.
1949	3	6	9
1950	4	3	7
1951	4	3	7
1952	1	5	6
1953	1	6	7
1954	1	7	8

Cases have occurred more or less thoughout the dairying districts with the Bunbury-Busselton area contributing the majority (11) ; while Kalgoorlie has accounted for four cases. The following is the detailed list of country locations where brucellosis has been recorded :—

Bunbury	9
Busselton	2
Kalgoorlie	4
Armdale	2
Norseman	1 each
Meekatharra	
Leonora	
Tardun	
Albany	
Narrogin	
Boyanup	
Capel	
Waroona	
Merredin	
Wooroloo	
Manjimup	
Dardanup	

Prevalence in Cattle in Western Australia.

" Contagious abortion " has been encountered throughout the dairying districts of Western Australia, and prior to the introduction of " Strain 19 " inoculation in 1946, the overall prevalence of brucella infection in cattle was about 10 per cent. So far as is known only the abortus type of brucella infection occurs in animals in Western Australia other than brucella ? ovis (which causes epididymitis in rams). Transmission of infection among cattle is from cow to cow mainly through the agency of contaminated pastures. Systematic immunisation of yearling with a single dose of 5 ccs. of attenuated " strain 19 " vaccine was introduced by the Department of Agriculture in 1946 and has been developed on a voluntary basis. At the present rate of inoculation some 70 per cent. of heifers produced annually in the dairying districts are being protected.

It has been estimated that there are about 800,000 cattle in Western Australia, of which possibly 100,000 are used for the production of milk, cream, butter and cheese. Only about 30,000 of these are concerned with the production of milk for retail distribution, the other 70,000 being used for the production of butter, cheese, etc.

Strain 19 inoculations recorded in the Annual Reports of the Department of Agriculture are as follows :—

Period.	Inoculations.
May 1946-June 1947	13,585
July 1947- ,, 1948	12,110
,, 1948- ,, 1949	11,673
,, 1949- ,, 1950	12,121
,, 1950- ,, 1951	18,618
,, 1951- ,, 1952	17,273
,, 1952- ,, 1953	18,937
May 1946-June 1953	104,317

Pasteurisation.

The development and extent of pasteurisation of milk is significant in relation to brucellosis as it is presumed that the majority of human infections in this State have been acquired through the consumption of raw milk, the minority being attributable to direct contact with infected cattle.

In 1946 only about 30 per cent. of milk consumed in the metropolitan area was pasteurised. By 1954, through the activity of the Milk Board this proportion had been increased to 99 per cent. ; and it is estimated that at least 60 per cent. of all the milk consumed in the State is pasteurised. Extension of delivery services to the country and the establishment of a new plant at Brunswick Junction promises to increase the supply of pasteurised milk and so still further reduce the chance of human brucellosis.

XI. RUBELLA (1828–1954).

The significance of rubella from the public health point of view was not appreciated until the association between maternal rubella and foetal malformation was established in Sydney (Gregg, 1941) ; and the disease was not made notifiable in Western Australia until 30th November, 1945. No reliable records of prevalence are therefore available prior to 1945, but studies on " Deafness as an Epidemic Disease in Australia " (Lancaster, 1951) suggest that epidemics of rubella may have occurred in Western Australia in 1879, 1898 and 1899, 1940 and 1941.

Lancaster assembled data for all the States and the following are his figures for Western Australia :—

Numbers Born Deaf Admitted to certain Institutions, by years :—

1879	19	1890	4	1900	2	1910	4	1920	3	1930	4
1880	1	1891	3	1901	2	1911	4	1921	6	1931	2
1881	....	1892	3	1902	5	1912	3	1922	2	1932	2
1882	....	1893	2	1903	2	1913	5	1923	4	1933	4
1883	....	1894	2	1904	2	1914	1	1924	2	1934	3
1884	2	1895	1	1905	2	1915	1	1925	5	1935	1
1885	2	1896	3	1906	3	1916	4	1926	2	1936	5
1886	1	1897	5	1907	5	1917	2	1927	5	1937	6
1887	4	1898	8	1908	5	1918	4	1928	4	1938	4
1888	3	1899	9	1909	2	1919	3	1929	6	1939	4
										1940	18
										1941	13
										1942	1

The following are the annual numbers of cases of rubella reported to the Commissioner of Public Health since the disease was made notifiable :—

Year.	Notifications.
1945	....
1946	28
1947	32
1948	61
1949	102
1950	44
1951	137
1952	147
1953	1,053
1954	627
1945–1954	2,231

The age incidence from 1948 to 1954 (inclusive) has been as follows :—

	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1948-1954.	%
0– 4	36	42	25	53	52	170	176	554	25·52
5– 9	15	37	9	16	21	149	93	340	15·66
10–14	1	5	2	17	9	119	51	204	9·40
15–19	2	5	1	18	8	363	153	550	25·33
20–24	4	4	5	14	18	86	58	189	8·71
25–29	1	5	....	5	11	38	26	86	3·96
30–34	....	2	2	3	11	29	17	64	2·95
35–39	....	....	....	2	6	20	15	43	1·98
40–44	1	2	....	4	7	22	14	50	2·30
45–49	....	....	....	3	2	15	5	25	1·15
50+	....	....	....	2	2	9	6	19	·88
Not stated	1	....	....	....	....	33	13	47	2·16
Total	61	102	44	137	147	1,053	627	2,171	100·00

The sex incidence from 1948 to 1954 (inclusive) has been as follows :—

	Males.	Females.	Total.
1948	25	36	61
1949	39	63	102
1950	17	27	44
1951	59	78	137
1952	72	75	147
1953	617	436	1,053
1954	305	322	627
1948–1954	1,134	1,037	2,171

The monthly incidence from 1951 to 1954 (inclusive) has been as follows :—

	1951.	1952.	1953.	1954.	1951-1954.	%
January	6	9	8	86	109	5·55
February	5	3	8	40	56	2·84
March	6	8	10	44	68	3·46
April	6	6	19	23	54	2·75
May	9	8	20	18	55	2·80
June	15	3	26	28	72	3·67
July	4	5	129	37	175	8·91
August	19	25	102	36	182	9·27
September	30	35	131	62	258	13·14
October	14	14	236	105	369	18·79
November	5	11	187	98	301	15·33
December	18	20	177	50	265	13·49
	137	147	1,053	627	1,964	100·00

References.

Gregg, N. McA. (1941)—" Congenital Cataract following German Measles in the Mother," Tr. Ophth. Soc. Aust., 3, 35.

Lancaster, H. O. (1951)—" Deafness as an Epidemic Disease in Australia," Brit. Med. Journ., ii, 1430.

Appendix XIII.

ABSTRACTS OF CONTRIBUTIONS TO THE LITERATURE BY AUTHORS ASSOCIATED WITH THE DEPARTMENT, 1954.

(From the Library)

Davidson, W. S. .... “*Isoniazid Alone and in Combination With Other Drugs in the Treatment of Leprosy,*” Leprosy Review, 25, 69–73. Author’s Summary : “Ten cases for 17 months and six cases for 12 months were treated with INH. The results compare favourably with results obtained with sulphetrone. There are indications against its use in conjunction with sulphetrone, but in conjunction with neustab results improved.”

Dockrill, T. E. .... “*A Comparison of Hair Follicle, Whisker and Dental Nerves.*” Australian Journal of Dentistry, 58, 339–348. Author’s Summary : “Nerves have been demonstrated on the hair and whisker follicle and on the tooth and its membrane. A similarity in the pattern of innervation of all three structures, compatible with their homology, is postulated. This similarity of nerve pattern is offered with an hypothesis, and with added support from the literature, to account for the high degree of sensitivity of each of these structures. New variations of technical methods have been devised for the demonstration of nervous structures.”

Kovacs, N. .... “*Eine Vereinfachte Methode zur Feststellung der Fibrinbildung bei der Prothrombinzeitbestimmung.*” Wiener Klinische Wochenschrift, 66, 611–612. Author’s Summary (Translated) : “A modified technique for Prothrombin Time Estimation is given which was found especially useful for serial examinations. The principle of the method is that instead of tilting the plasma-thromboplastin-calcium mixture, fine air bubbles are blown through the fluid with a fine needle. When the plasma clots the bubbles cannot rise to the surface of the fluid but remain entrapped in the fibrin clot. This moment indicates the point for reading the Prothrombin Time.

“For the test a special needle and an adapted tuberculin syringe are used and the reading is done in a transparent water bath under the light beam of a strong microscope lamp.

“The method is easier and quicker than the technique generally used.”

Appendix XIV.

The Commissioner of Public Health.

Before submitting this, my last annual report on the Infant Health activities throughout Western Australia, I would like to take this opportunity of expressing to the Government, the Public Health Department, and yourself, my appreciation of the unfailing courtesy, consideration and co-operation which I have always received in my work of organising and developing the Infant Health Service throughout this State. Without this interest and the initiative attitude of the Government, and without your loyal support, this progress would not have been possible.

The development of the Service is shown by the fact that when I took over there were 10 Centres, whereas now there are, at the end of December, 1954, 346, and arrangements have been made for still further to be opened during the coming year. The whole state is now completely covered to fulfil the requirements of the present population.

For the year ending 31st December, 1954, over 20,000 different children were seen in Infant Health Clinics throughout the State. The progressive increase in this annual figure is being maintained.

Thirteen thousand seven hundred and two notifications of live births were sent to the Infant Health Centres. The difference between the individual babies seen and the births notified is accounted for by the fact that some babies are still attending from the previous year, and also by new-comers to the State.

The total attendance at all Centres was 194,980.

The great majority of the mothers with babies attend our Infant Health Centres. As it is our policy to have only one Sister in a Centre, the Sister comes to know every mother with a baby in her district, and is able to check attendances and pay home visits if needed.

When a Centre becomes too big for one Sister to look after properly it is split up and divided into smaller areas, with another Sister in charge of the new area. By this means, every mother and baby can be kept under observation.

The principle of having more than one Sister in a Centre leaves many loop-holes for negligent mothers to slip through. Also the Sisters themselves prefer to be in sole charge of their own district, particularly those Sisters who are very responsible people and keen on their work. Western Australia is fortunate in having a vast number of these officers in the Infant Health Service, and, indeed, the Sisters are selected for these qualities.

There has been a determined effort to keep in touch with the children at the Infant Health Centre after they have passed their first birthday and come into the toddler and pre-school age group. We have not been as successful in this field as we could have wished owing to the fact that the Sisters in the Centres have not been able to keep contact constantly. However, it is hoped that in the near future this problem will be overcome by the establishment of a special section which will deal with this age group.

Correspondence Section.

The Correspondence Infant Health section still, and I feel always will, serves a very useful purpose in this State. This section takes in all mothers living in isolated places, such as in the Kimberleys, North-West, Murchison, etc., where the establishment of a full-time Centre is not justified.

Also, if at any time a country Centre becomes vacant through a Sister leaving, the Correspondence section immediately goes into operation and contacts all the mothers. This Correspondence section must therefore always be needed in any Infant Health organization.

Last year the new babies who were on the Correspondence Infant Health section's roll—that is, babies belonging to that section only, not taking into account those babies whose Centres were shut and were taken over temporarily by the Correspondence Sister—numbered 467, making a total of 856 individual babies who were in touch with the Centre during the year.

One thousand nine hundred and twenty-six letters were received and 2,068 letters were written, in addition to the circular letters which were sent out to mothers with new babies, notifying them that the help of the Centre is available to them.

Four hundred and sixteen mothers paid visits to the Centre when in Perth and, in addition, there were consultations with 198 expectant mothers.

Telephone consultations totalled 357. These telephone consultations with the Correspondence section are valuable because they are with mothers in far distant parts of the State.

Quite frequently new Infant Health Centres are developed in the country and given the status of an independent Centre as a result of the need being shown to us through the Correspondence section, which therefore acts as a valuable " pioneering " agent in the Service. The Correspondence section is one which must always stay in existence because of those parts of the State which are too remote to form part of a fixed Centre.

In addition to the office work the Correspondence Sister visits at regular intervals throughout the year :—

Yalgoo and Murchison Stations.
Mt. Magnet.
Cue.
Meekatharra.
Wiluna.
Wittenoom.
Halls Creek.
Fitzroy Crossing.
Onslow.
Roebourne.
Port Hedland.
Broome.
Derby.
Wyndham.
Kimberley Stations.

As a result of the interest taken in the Infant Health work in Carnarvon and because it was ascertained that there are between 80 and 90 births per year there, it was decided to start a regular monthly Clinic in that town. The Sister flies up from Perth and has 1¾ days there to attend to the mothers and babies. This service is growing and is much appreciated by the district.

The Sister pays visits to the North-West and Kimberley areas by plane.

The mothers frequently travel a great distance in the outback to see the Sister and receive help from her, so even though the figures might not be very high it is felt that the trips are well worth while because of the assistance that can be given to mothers who normally have very few amenities. They are, of course, costly to maintain.

Also, during these visits the Sister examines as many pre-school children as possible in addition to the babies.

As well as giving the service to the places previously mentioned, the Sister keeps in contact with all mothers in even more scattered and isolated places throughout the State.

" *Tea and Sugar* " *Train.*

A new Child Health Service was started this year, and the last large gap in the State's service was filled in and, thus, every Mother in Western Australia is now ensured of the facilities of the Infant Health organisation.

The " Tea and Sugar " train is the train which carries the stores to all the station people and workers on the Trans-Continental Railway Line between Parkeston in Western Australia and Port Augusta in South Australia. The train goes through to Port Augusta and it seemed very unfair to those mothers with babies living just on the other side of the border that they should not be able to receive the service given the mothers on the Western Australian side.

The South Australian people were given the opportunity of coming up and doing the South Australian side, but their staff problems were such that they were unable to co-operate, but they were quite agreeable that we should carry through. The Commonwealth Railways wanted us to do so as they wished all their railway workmen and their families to have the same amenities. We were perfectly willing to carry through as it did not mean any loss of time to us as we would have had to wait for the return Trans train in any case. The position is, therefore, that we go from Parkeston to Pimba, which is a station three or four stops this side of Port Augusta, the Sister leaving the train at Pimba to pick up the Trans train an hour later and so return to Perth with a minimum of delay.

The Commonwealth Government has been most co-operative and anxious for this service to start, and did all that it could to make it a success. An entire coach was placed at our disposal with the compartments fitted up as a waiting room, a consulting room, a bedroom for the Sister and one for the Doctor (I went for the first two trips myself). In addition, there was a little sitting-room and kitchen—we have to cook all our own meals on the train—and a washroom. All the mothers are very keen on this travelling clinic, so much so that we are thinking of increasing the frequency of the trip to once every two months instead of every three months as at present. They ALL come.

A great deal of publicity is given to the trip and commercial firms have been very good in giving me gifts which are handed out to the children, and are very much appreciated by them as can be imagined. None of them is permitted to have his gift until after he has been seen both by the Sister and the Doctor.

The figures for the trips are as under :—

	March.	July.	November.
Babies	23	20	28
Toddlers	55	23	26
Pre-School		61	60
School Children	37	92	43
Expectant Mothers	7	9	7
Adults	9	43	5
Totals	131	248	169

Trips have been done at all times of the year so the Sister can help with the problems that the mothers meet during all weathers, and she knows what they have to contend with.

In answer to the question :—

(a) Is the trip of value ?

(b) Will the people avail themselves of it ?

the answer is an unqualified "'Yes."

Now that the service has proved its worth the Commonwealth Railways are re-modelling, furnishing and painting a coach to be known as the " Child Health coach " to my specifications. This coach will be in operation very soon and it will, I hope, ensure the continuance of this service to these mothers.

There are two fair sized settlements on the South Australian side, *viz.*, Cook and Tarcoola, and at both of these places there are small hospitals with nurses, run by a Church of England New South Wales Society, and already providing a service. We receive the greatest welcome from the nurses at these places, and often we are able to help them, but only at their request.

Infant Health Caravan.

A Caravan was built and fully equipped as an Infant Health Centre and started operations in February of this year. The Caravan proved such a success that the Sister in charge of it wrote in within a couple of weeks as follows :—

> " There are 14 days work to be done in five days, and the Caravan is so much appreciated by the mothers that they come from far and near."

This Caravan was entirely given to us and furnished by the Lotteries Commission. It was built on to a one-ton Chevrolet truck chassis.

The Caravan works from Beaconsfield, South Fremantle, and right through via Hamilton Hill and Spearwood to Medina, Rockingham and Safety Bay. As the Sister is now so very busy it is intended to divide up the work and make a further Centre in this area.

Three more Infant Health Caravans are now visualised, one for the outer Armadale district, one for the hills district through Parkerville, Wundowie, etc., and the third for the Upper Swan district.

Caravans have a very distinct use in scattered places because they save the necessity of erecting multiple buildings in small villages.

The Caravans are, however, entirely unsuitable for large towns and suburbs because of the large numbers of mothers who gather and have to wait to see the Sister, and as there is no adequate waiting-room for them, there is great inconvenience especially in wet weather. For small groups where there are two or three mothers, however, some sort of shelter can usually be found.

Home Visits.

Home visits paid by the Infant Health Sister to homes where babies are being reared are of vital importance because only in this way can a Sister see at first hand the conditions under which the child is being brought up. More home visits are paid in the metropolitan Centres because it is not always possible for the Sisters in the country to devote the necessary time to the visits. In the big country towns they are carried out in the same way as in the metropolitan area where practicable.

The first visit is paid as soon as possible after the mother comes home from the hospital with a new baby, because at that time the Sister is able to give the mother much valuable help and advice in the care of the child, and also to make contact between herself and the mother, followed by visits to the Centre.

The number of home visits paid for the year were 18,924, as against 18,176 for the previous year.

Telephones.

Whenever there is a proper Centre building it is our aim to have a telephone installed. In the case of bad weather, or the presence of an infectious disease, the mother can, by ringing the Sister, get the necessary advice without risking carrying the infection to the Centre. It is a strict rule that no child with any infectious disease is permitted to come to a Centre.

Advices given by telephone from our Centres (excluding the Correspondence section) totalled 3,540, *Breast Feeding Returns.*

The breast feeding figures for 1954 are shown hereunder :—

Feeding.	Fully Breast Fed.		Partially Breast Fed.		Artificially Fed.		Total Cases.
When first seen	7,753	68·2%	1,121	9·9%	2,496	21·9%	11,370
At 13 weeks	5,064	48·5%	1,352	12·9%	4,029	38·6%	10,445
At 26 weeks	3,227	35·1%	639	6·9%	5,340	58·0%	9,206

This system of recording has been brought into line with dates in use in other parts of the world so that it can be used for comparison purposes.

The figures for breast feeding in the metropolitan area are higher than those in the country for both partially and fully breast fed babies.

In some districts where the breast feeding figures are undoubtedly better than others, this is a tribute to the wisdom and enthusiasm of the Sisters in charge of these areas, and the manner in which they encourage and educate the mothers both to establish and continue with breast feeding. Unfortunately, however, we find that a lot of the babies come out of the hospitals already on the bottle, and when this happens it is very difficult to re-establish the breast milk.

Expansion.

The Infant Health work continues to expand and there are now 46 main Centres from which are run 300 Sub-Centres, making a total of 346 Centres allocated as hereunder :—

Centres :		
Metropolitan, including Correspondence Scheme	22	
Country	24	
		46
Sub-Centres :		
Metropolitan	83	
Country	217	
		300
		346

New Infant Health Centre Buildings.

When the present Government assumed office in February, 1953, it established as its principle that it would give financial assistance to all districts wishing to erect an Infant Health Centre building, provided certain conditions were complied with. Consequently, many Committees and Local Authorities availed themselves of this assistance and erected properly designed buildings for Infant Health Centres. The impetus for this building started in 1953 and was in full swing in 1954, with the result that the following buildings were actually completed and opened by the end of that year.

New buildings were opened at :—

Applecross
East Cannington
Gnowangerup
Bicton
Wongan Hills
Boddington
Subiaco
York
Harvey
Margaret River
Boyup Brook, and
The Eleanor M. Stang Centre, 1120 Hay St., Perth.

The following buildings were also opened and included living quarters for the Sister :—

Busselton
Boulder
Bridgetown
Pinjarra

A house was purchased at Norseman as living quarters for the Sister.

Special rooms for Infant Health but connected to another building, were opened at :—

Goomalling
Brookton
Tammin
Darkan
Nyamup, and
Narembee

All the buildings have been beautifully furnished with the latest equipment for Infant Health work. The living quarters are fully furnished throughout.

Practically all districts throughout the country where a Sister has her headquarters now have buildings with furnished living quarters provided. The Moora Centre, which previously did not have such quarters, now has them in course of erection. Kellerberrin has accepted a tender and is due to start building early in 1955. At the other two places which require living quarters—Northam and Mt. Barker, everything is in hand for the commencement of the project in 1955.

It is interesting to note that these figures make a total of 30 new, properly designed, Infant Health buildings and rooms which have been opened since my return from England at the end of 1952.

A large new Centre was erected in the City of Perth to be the headquarters for the Infant Health work. In this building is housed the Correspondence Section, Mothercraft Section, West Perth Sub-Centre and the new Pre-School Section to be started in the near future. Here also is the Lecture Hall in which the Refresher Course is held every year. The building has been designed in such a way that the large Waiting room and Lecture Hall can be combined to allow for future increased attendances.

Many new features have been installed in the building to make it as efficient as possible and compatible with present-day knowledge.

This building was named the " Eleanor M. Stang Infant Health Centre " at the request of the Infant Health Sisters of Western Australia and with the blessing of the Government, a compliment I very much appreciate.

Mothercraft Section.

Mothercraft lectures were given in 17 metropolitan High Schools, Colleges and Convents, and in 19 country High Schools and Convents.

In the metropolitan area the lectures are given by the two Mothercraft Lecturers but in the country schools they are given by the Infant Health Sisters stationed in the areas. The country work is supervised by the Senior Mothercraft Lecturer who also gives refresher courses to the Sisters.

The number of children receiving lectures was 1,513 and of these 1,015 received certificates stating they had attended all the lectures. Lectures were given to a total of 63 classes.

Lectures were also given on Mothercraft at the Teachers' Training College, Nurses' Central Training School, Alexandra Home and to Kindergarten Teachers.

The Classes for Expectant Parents continued to be run. One of the conditions for this class is that the wife must be pregnant and that the father must also come. We want to train the fathers to assist the wives in the care of their babies.

All students attending classes must attend either an Infant Health centre or the Mothercraft Corner at the Eleanor M. Stang Infant Health Centre to see practical demonstrations on babies. The Mothercraft Corner is set up most attractively and is an excellent place for parents to see all the things they need for their baby. They can ask questions and take measurements of the cot, etc., which the fathers often go home and make.

During the school holidays when the Sisters giving the Mothercraft lectures are not employed on that work they are used for doing " locum " work for the Sisters in the metropolitan Infant Health Centres during their holiday periods.

Royal Show.

This section was first started for the Public Health Department by the Child Health Section in 1930. In the first year it was done in a marquee, in the second year, a wooden building, but it was a great success in both places, and in the third year it was done also in this wooden building. After that the display was discontinued, not because it was not worth while, but because of lack of funds in the depression years. Then, five years ago it was revived and is now an excellent advertisement for the work being done by the Public Health Department. At this year's Royal Show display girls from several schools gave demonstrations of Mothercraft work taught in the schools, which created a lot of interest.

Leaflets.

There are three types of leaflets used in Child Health, one for the Mothercraft section, another dealing with Infant Health problems and a third for the pre-school child. These leaflets have all been brought up to date and are very attractively presented.

Radio Talks.

Talks were organised, as in previous years, and put on over a radio network throughout the whole State. These talks are a weekly feature and continue to prove very popular. Our sincere thanks are due to the following stations :—6 AM., 6 PM., 6 KG., 6 GE., for letting us give these talks. These talks, which in no way take the place of visits to the Centres but give general advice to mothers, assist in maintaining constant and regular interest in child health.

Infant Mortality.

The infant mortality rate for 1954 was the lowest yet for Western Australia, having dropped from 23·83 in 1953, to 22·54. This drop, however, is only in conformity with the fall in the mortality rate in other States. Nevertheless, taking into consideration the scattered population of our State and the difficulty of rearing infants in outback areas, the West Australian figure compares favourably with those elsewhere.

	Per 1,000 Live Births.
New South Wales	25·29
Victoria	19·30
Queensland	22·29
South Australia	21·29
Tasmania	23·94
Western Australia	22·54

It is interesting to note that the Infant Mortality figures as from 1929 to 1954 show a consistent drop year by year, from 56·13 per 1,000 live births in 1929 to 22·54 in 1954. This consistent drop in infant mortality figures can be very greatly accredited to the Infant Health work throughout the State.

The highest number of deaths is in the 0–1 month group, being 256 for 1954, and only 103 babies died in the 1–12 months group, which is that attending the Infant Health Centres.

Pre-School Section.

The Infant Health Sisters are taking an increasing interest in this section of the work and in some Centres are having special Pre-school days for their mothers to bring the toddlers along. When the mother has a baby as well she is encouraged to bring the toddler with her so the child can be kept under regular supervision by the Sister. For this purpose special pre-school supervision cards have been printed and a record is kept of each child.

The Sisters are issued with a diary and a large number of appointment cards ; they give the mother of a toddler an appointment for her next visit, which might be one, three or six months ahead, according to the age of the child.

As part of our pre-school programme the School Medical Service has undertaken the responsibility for the examination of all children at Kindergartens.

Lotteries Commission.

The Lotteries Commission has, as ever, been extremely generous to the Infant Health Service and has provided new scales for quite a few new Centres as well as replacing many of our old sets.

Also the Commission has been most generous towards assisting in the cost of erection of new buildings, and in some cases gave money towards the furnishing of special rooms.

The first Health Caravan which was put on the roads this year was entirely donated by the Lotteries Commission, being presented to the Department fully equipped and ready for work.

This continued assistance from the Lotteries Commission towards the work of the Infant Health Service is very much appreciated by the Department.

Local Infant Health Committees.

Some towns and suburbs still have a local Infant Health Committee which is responsible in most cases for the building, furnishing, cleaning and maintenance of the Centre, and for the purchase of a motor car where one is necessary.

The Committees are purely honorary and do a great deal of hard work on behalf of Infant Health activities in their own towns and districts. The grateful thanks of the Department are due to them for their co-operation.

There is a tendency, however, latterly for Committees to hand over their responsibilities to Local Authorities. The Committees state that it is very difficult to get younger people to come and take an interest in the work as they all feel it is a Government responsibility. I am grateful that they have assisted for as long as they have.

Local Authorities.

It continues to be the policy of this Department to encourage all Local Authorities to take an ever-increasing interest in Infant Health activities. It is evident that they are becoming much more sympathetic, and in a great number of instances are prepared to accept a greater responsibility towards this social service.

In many cases they are assuming the role of the Infant Health Committee, while others are assisting the Infant Health Committee or, again, assuming the full responsibility for the planning and erection of the building, leaving the Infant Health Committee the responsibility for the furnishing, maintenance and cleaning thereof. It is very gratifying to note this trend of the Local Authorities towards accepting responsibility for the service.

The Government.

The Government has been very generous and interested in this section of preventive medicine, and as I have already said, has recognised the great value that it is to the public by giving financial assistance towards the erection of permanent buildings to house the work.

It has on all occasions granted the requested money for necessary extra staff required for further expansions of the work, as well as paying the Sisters' salaries, mileage rates, overnight expenses and the general petty expenses of the Centre.

Staff.

The staff of the Infant Health Service consists of 50 Triple-Certificated Sisters, who have worked untiringly towards furthering Infant Health activities throughout the State.

CONCLUSION.

I would like to express my sincere thanks to the Sisters of the Infant Health Service for their loyal and faithful service in their Centres. They are an extremely fine band of Sisters who do not count the cost of what they give to their work, but work devotedly and interestedly on behalf of the mothers and babies. They do their work in a spirit of service to the community, and it is a very rare thing indeed to ever hear a complaint from a Sister that she is working too hard. In fact, if anything, they are all the time seeking further avenues whereby they can help the mothers. Many of the Centres are exceedingly large and still the Sisters give of their utmost to the work without complaint as they know the Centres will be divided up as soon as it is at all practicable.

Most of the Sisters in the organisation have been with it for many years, and speaking generally, no Sister is taken on the staff unless she will promise to stay at least two years, because continuity of service with the mothers is one of the great factors in the success of the work. I feel completely confident in saying I think Western Australia has one of the very best teams of Infant Health Sisters in the whole of Australia.

This year I was sorry to lose Sister Nicholson, our First Correspondence Infant Health Sister, who had been with the service right since its inception. Sister retired from the work with much regret, but she was past the retiring age and had only stayed on to convenience the Department. Both her spirit and her knowledge are a loss to this section.

I extend my grateful thanks to the Infant Health Sisters for their faithful service and very excellent team work.

Once again, and finally, as I am retiring and this is my last opportunity to acknowledge publicly the help I have always received—I wish to thank the Commissioner of Public Health for his ever ready and active support to me in my work, and the Minister for Health and the Government for the keen interest that they have always shown in matters pertaining to Maternal and Infant Health, and for the help they have accorded me to enable this work to be properly and permanently established.

E. M. STANG, M.B., B.S., D.P.H.,

Medical Supervisor of Infant Health.

Appendix XV.

ANNUAL SUMMARY JANUARY – DECEMBER 1954.

Centres.	Gross Number of Attendances.					Individual Babies Attended.					Birth Notifications Received. (11)	New Babies. (12)	Transfers from other Centres. (13)	Visiting Babies. (14)	Individual Expectant Mothers. (15)
	Under 12 months. (1)	1–2 years. (2)	Total 1 + 2. (3)	Over 2 years. (4)	Grand Total 3 + 4. (5)	Under 12 months. (6)	1–2 years. (7)	Total 6 + 7. (8)	Over 2 years. (9)	Grand Total 8 + 9. (10)					
Country—															
Albany	4,187	308	4,495	156	4,651	459	109	568	98	666	435	327	21	99	16
Bridgetown	2,050	80	2,130	18	2,148	283	44	327	18	345	237	181	11	29	....
Beverley	3,119	520	3,639	64	3,703	187	165	352	36	388	198	178	14	45	25
Boulder	2,586	160	2,746	76	2,822	412	94	506	63	569	214	148	9	44	10
Bunbury	3,085	175	3,260	91	3,351	439	44	483	43	526	301	220	13	102	4
Busselton	5,063	378	5,441	73	5,514	478	155	633	39	672	401	324	14	129	2
Collie	2,307	37	2,344	....	2,344	264	37	301	....	301	312	188	8	4	....
Corrigin	1,508	159	1,667	141	1,808	216	71	287	82	369	179	197	17	10	15
Esperance	11	4	15	3	18	4	3	7	1	8	4	4	....	....	2
Geraldton	3,461	169	3,630	23	3,653	431	50	481	11	492	383	267	15	55	9
Kalgoorlie	5,051	362	5,413	236	5,649	307	200	507	140	647	413	314	17	78	8
Katanning	2,751	230	2,981	56	3,037	347	45	392	9	401	278	238	12	49	3
Kellerberrin	3,300	289	3,589	89	3,678	217	95	312	42	354	234	135	25	55	....
Manjimup	3,341	240	3,581	40	3,621	230	100	330	24	354	279	233	19	44	....
Moora	2,749	306	3,055	332	3,387	389	68	457	183	640	258	313	55	54	28
Narrogin	2,889	301	3,190	126	3,316	347	117	464	74	538	303	253	26	29	....
Northam	2,544	164	2,708	42	2,750	343	80	423	45	468	231	200	12	54	14
Mundaring	4,300	368	4,668	128	4,796	266	84	350	37	387	195	162	8	44	52
Three Springs	3,441	611	4,052	248	4,300	198	106	304	116	420	221	204	23	17	33
Wagin	2,746	275	3,021	127	3,148	216	37	253	26	279	237	192	19	41	19
Walpole	168	4	172	....	172	....	....	....	....	....	....	....	....	....	....
Waroona	3,837	203	4,040	24	4,064	415	59	474	6	480	295	225	25	88	18
Wyalkatchem	1,323	156	1,479	71	1,550	212	40	252	5	257	112	178	14	13	30
Metropolitan—															
Armadale	4,310	227	4,537	39	4,576	318	71	389	30	419	345	268	28	71	28
Bayswater	6,460	657	7,117	219	7,336	441	229	670	113	783	505	382	63	40	47
Bicton	4,386	109	4,495	44	4,539	467	30	497	4	501	435	366	57	26	1
Caravan No. 1	4,072	530	4,602	397	4,999	446	104	550	102	652	270	258	276	58	68
Claremont	2,819	105	2,924	772	3,696	336	97	433	184	617	295	231	20	13	27
Cottesloe	5,555	414	5,969	178	6,147	472	113	585	93	678	294	269	25	131	1
East Fremantle	3,812	352	4,164	645	4,809	352	93	445	100	545	251	199	42	34	15
East Victoria Park	5,390	202	5,592	217	5,809	347	92	439	82	521	393	426	80	103	14
Fremantle	4,872	222	5,094	387	5,481	517	86	603	118	721	354	388	33	234	9
Inglewood	5,299	355	5,654	94	5,748	460	124	584	34	618	330	352	38	48	30
Kalamunda	4,426	362	4,788	46	4,834	359	137	496	24	520	351	254	42	....	....
Kensington	5,780	457	6,237	218	6,455	393	306	699	115	814	226	295	56	144	24
Leederville	5,017	399	5,416	231	5,647	294	135	429	158	587	339	288	48	59	26
Maylands	4,205	114	4,319	....	4,319	306	10	316	....	316	261	225	....	....	....
Midland Junction	5,134	478	5,612	48	5,660	417	95	512	4	516	376	305	30	55	2
Nedlands	3,138	165	3,303	299	3,602	297	25	322	35	357	119	167	7	8	10
North Perth	4,908	280	5,188	163	5,351	473	133	606	108	714	414	342	62	82	26
Osborne Park	6,212	207	6,419	6	6,425	554	105	659	6	665	403	360	32	75	....
South Perth	3,794	239	4,033	38	4,071	288	22	310	....	310	300	220	45	67	....
Subiaco	4,108	343	4,451	352	4,803	355	182	537	207	744	271	306	50	61	37
Perth	5,348	283	5,631	58	5,689	559	78	637	55	692	529	433	84	285	59
Victoria Park	4,644	197	4,841	14	4,855	450	80	530	16	546	480	436	62	244	7
Wembley	6,274	261	6,535	114	6,649	513	97	610	25	635	441	386	45	51	13
Totals	175,780	12,457	188,237	6,743	194,980	16,074	4,247	20,321	2,711	23,032	13,702	11,837	1,602	2,974	732

Appendix XV.—*continued.*

Centres.	Medical						Visits						Advice by Letter.	Advice by Telephone.	Mothers' Referred Correspondence Sister.	Lectures given.	Group Demonstrations.	Deaths.
	Doctor.		Hospital.		Total.		Hospital (Number of Babies).	Home.										
	Baby Referred. (16)	Mother Referred. (17)	Baby Referred. (18)	Mother Referred. (19)	Babies Referred 16 + 18. (20)	Mothers Referred 17 + 19. (21)	(22)	To Babies, First. (23)	To Babies, Subsequent. (24)	Expectant Mothers. (25)	Ineffective. (26)	Total 23 — 26. (27)	(28)	(29)	(30)	(31)	(32)	(33)
Country—																		
Albany	128	26	....	....	128	26	415	74	83	....	16	173	45	160	1	10	6	4
Bridgetown	....	....	....	....	....	....	181	11	79	1	4	95	....	39	....	....	....	....
Beverley	57	1	1	....	58	1	262	51	46	5	4	106	4	85	29	27	11	2
Boulder	31	6	....	....	31	6	171	148	19	1	32	200	....	14	....	....	....	....
Bunbury	14	....	....	....	14	....	373	97	63	11	49	220	1	63	....	12	....	1
Busselton	30	2	....	....	30	2	329	....	....	....	....	....	1	18	4	5	....	7
Collie	34	....	....	....	34	....	343	118	....	....	....	118	....	....	....	....	....	....
Corrigin	37	5	6	1	43	6	198	23	68	....	1	92	1	48	....	....	....	....
Esperance	....	....	....	....	....	....	6	7	....	....	....	7	....	....	....	....	....	....
Geraldton	15	1	....	....	15	1	622	60	88	....	7	155	6	68	6	10	....	....
Kalgoorlie	120	35	....	....	120	35	520	212	8	4	21	245	2	343	....	25	6	3
Katanning	21	1	....	....	21	1	282	13	76	....	7	96	4	53	....	4	1	....
Kellerberrin	19	2	....	....	19	2	230	7	287	....	....	294	....	....	....	11	....	....
Manjimup	49	3	2	....	51	3	257	....	....	....	....	....	....	43	....	....	....	....
Moora	140	37	....	....	140	37	321	100	116	4	22	242	8	6	22	....	....	2
Narrogin	43	14	1	....	44	14	284	71	33	....	7	111	3	64	3	9	2	....
Northam	28	5	....	....	28	5	369	182	568	2	59	811	....	55	19	....	....	....
Mundaring	52	17	....	2	52	19	....	154	1,460	....	19	1,633	11	21	....	....	....	....
Three Springs	57	19	....		57	19	233	49	31	4	4	88	27	191	....	....	....	....
Wagin	66	9	....	....	66	9	198	49	244	5	26	324	12	32	18	29	23	....
Walpole	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Waroona	38	6	....	....	38	6	199	6	38	4	1	49	....	8	....	....	....	....
Wyalkatchem	29	7	2	....	31	7	77	45	20	2	....	67	6	4	....	....	....	....
Metropolitan—																		
Armadale	63	9	6	....	69	9	145	88	1,033	5	2	1,128	....	....	....	....	....	2
Bayswater	74	8	1	2	75	10	....	516	243	....	18	777	8	2	....	....	....	3
Bicton	34	7	....	....	34	7	....	440	266	3	3	712	....	14	....	....	....	....
Caravan No. 1	123	24	....	....	9	1	18	124	66	15	15	220	1	2	....	....	....	....
Claremont	24	6	1	....	25	6	....	294	1,033	12	7	1,346	....	98	....	....	....	....
Cottesloe	46	5	....	1	46	6	42	242	210	1	17	470	....	....	....	....	....	....
East Fremantle	80	5	....	....	80	5	16	197	281	....	3	481	1	2	....	....	....	....
East Victoria Park	71	15	....	....	71	15	....	218	56	9	67	350	....	113	....	....	....	....
Fremantle	....	....	....	....	....	....	11	278	489	6	42	815	....	....	....	....	....	....
Inglewood	85	18	1	....	86	18	....	236	79	1	33	349	....	75	....	....	....	....
Kalamunda	....	....	3	1	3	1	....	138	596	....	27	761	3	7	....	....	....	....
Kensington	42	10	1	....	43	10	....	258	255	4	....	517	....	104	....	....	....	....
Leederville	37	9	2	....	39	9	....	257	280	7	89	633	....	....	....	....	....	....
Maylands	38	4	....	....	38	4	....	198	90	1	....	289	....	....	....	....	....	....
Midland Junction	27	2	....	....	27	2	216	95	12	58	19	184	....	....	....	....	....	....
Nedlands	19	4	1	....	20	4	....	92	422	1	....	515	....	23	....	....	....	....
North Perth	90	15	....	....	90	15	....	421	422	....	....	843	40	293	....	....	....	....
Osborne Park	81	24	....	....	81	24	....	393	79	....	92	564	....	....	....	....	....	
South Perth	26	....	....	....	26	....	....	221	83	....	9	313	7	122	....	....	....	....
Subiaco	104	9	6	....	110	9	....	298	520	22	1	841	....	31	....	....	....	....
Perth	102	30	2	1	104	31	....	626	83	4	47	760	....	894	....	....	....	....
Victoria Park	49	8	....	....	49	8	....	399	44	....	10	453	....	355	....	....	....	....
Wembley	32	1	1	....	33	1	....	375	84	....	18	477	....	97	....	....	....	....
Totals	2,255	409	34	7	2,289	416	6,308	7,881	10,053	192	798	18,924	188	3,540	102	142	49	27

Appendix XVI.

The Commissioner of Public Health.

I have the honour to submit a report on the School Medical Service in Western Australia for the year 1954.

The total staff available for this service was one administrative officer, five full-time School Medical Officers and 10 full-time Nurses.

Even though we were actually one doctor short for some months it was possible to carry out a systematic examination of the children throughout the State attending High Schools, State Schools, Convents and Kindergartens.

Every child from kindergarten age to and including high school pupils is examined every second year.

Where possible, all native children at Mission schools have had the routine School Medical examination extended to them.

For the year 1954, 40,964 children were examined, of which 20,150 were in the metropolitan and sub-metropolitan schools and 20,814 were in the country schools. These children were examined in 295 schools, which include State Schools, Catholic Schools, Kindergartens and North-West Schools.

The number of children of school age throughout Western Australia in Primary, High Schools and Convents increased considerably this year, by over 9,000 so that the number now stands at 116,000.

It is interesting to note that the number of children notified for some attention was 16,670. The majority of defects were slight and actually of the 16,670 only 6,183 were referred for medical attention, though this is about 2,000 more than were referred last year.

Again, the number of children referred for dental attention rose very considerably as this year the figure was 10,215 as against 6,259 for the previous 12 months.

It is difficult to explain this increased number requiring medical and dental attention, unless it was due to different country districts being covered, and many defects which had previously missed having the required medical attention might have been brought to light. These children should now benefit from the extended examination which was given them.

Children requiring medical attention for their eyes totalled 2,183, 832 in the metropolitan area and 1,351 in the country ; this is against 1,524 for the previous 12 months, 814 in the metropolitan area and 710 in the country.

Another defect which is frequently notified for medical attention is diseased tonsils, 1,375 being notified—331 in the city and 1,044 in the country areas. For the previous year 637 were notified for this complaint, 449 of whom were in the country.

The rest of the children who were referred for medical attention were suffering from a variety of conditions, such as heart defects, rheumatism, skin complaints, asthma, marked postural or marked speech defects, etc.

The system of sending school children with defective hearing to the Commonwealth Acoustic Laboratory is a routine practice in the State now, and for the year 1954, 194 children visited the Acoustic Laboratory. This is an excellent service and has greatly aided many children with defective hearing.

When the child is referred to the Laboratory, the type and degree of deafness can be ascertained there and advice given to the parents concerning prognosis and, when necessary, the child is referred for specialist medical treatment.

Parental Interviews.

Although it has always been the practice of this Department for the School Doctors to see all parents who wish to have an interview, especially those whose children have some special defect, this system has been extended further and a special point is made of inviting all parents of " new entrants " to the school, that is the younger age group, to see the Doctor. Special invitations are sent out by the Doctors to the parents of children in this age group to come along and discuss their child with the Doctor.

These interviews should be one of the most valuable sections of the work because they link the School medical examinations with the home, and throw the responsibility for the child's health right back on to the parents, where it belongs.

Many parents avail themselves of the invitation to see the Doctor with the result that this year we had 1,737 parental interviews. Where the case is a very special one and the mother does not attend for the interview, she is visited in her home within the next few days. In the case of New Australians who cannot speak English, arrangements are made for an interpreter to be present.

Nutrition.

Of the total number of children examined (40,964), it was found that 36,286 were of normal nutrition, 3,252 were above the normal standard, and only 1,426, that is 3·48 per cent., were below standard nutrition. It is always amazing to me that there should be any under-nourished children in this State.

Actually, it does not mean, in my opinion, that the children are not getting enough to eat, but it does mean that they are not getting the right kind of food. There are many parents who will persist in giving their children money for school lunches, which so often means a packet of biscuits or a meat pie, lollies and a " cool drink," instead of going to the trouble of putting up a suitable lunch of sandwiches and food materials as recommended by us—for which there are pamphlets prepared—to ensure the child receives the correct diet for its lunch.

There is undoubtedly still a great deal of room for the education of parents regarding proper food for their children, and in this connection, it is disappointing to note that the Oslo Lunch project, which is worked so extremely satisfactorily in some schools, has not got a wider popularity than it deserves. Where there is an interested and enthusiastic Head Teacher with a suitable Oslo Lunch Committee, the children can then be provided with a very satisfactory lunch for about 1s. per day, and this is a much better lunch than most mothers would be able to provide for the same figure. The reason is, of course, that the Oslo Lunch Committee buys all the materials for the lunch in bulk and therefore buys at a cheaper or even wholesale rate.

It would be very helpful if the Education Department would actively associate itself with this project and encourage the teachers to establish this lunch in their schools. Once the organisation for the Lunch is done the Teachers do not then have very much work in connection with it, as it is run by a Mothers' Committee known as the Oslo Lunch Committee. The original organisation has to be done by the teachers as they are the only ones able to make the necessary contacts.

North-West.

Throughout the North-West and the Kimberleys the school children receive a yearly examination because there they are examined by the Public Health Department's local doctors.

School Nurses.

There are 10 School Nurses on the staff. These Nurses are hand-picked because the success of the work depends on the Nurse's suitability and adaptability to this special work, particularly in regard to home visiting, and in their relations and approach to those with whom they work, such as the teachers and other members of the School team.

Home Visiting.

The Home Visiting or, as it is so frequently called, the follow-up section, is of paramount importance in the School Medical Service.

As a result of these home visits the condition from which a child is suffering is explained to the parent in a manner which he or she can understand and, furthermore, the necessity for treatment is emphasised.

Many parents do not understand that a real defect is present in their child, or if they do understand they frequently do not realise the dangers which might lie ahead should the defect be neglected ; but when the problem is explained kindly, slowly, intelligently and sympathetically by the School Nurse they then willingly and actively co-operate. The vast majority of parents are only too anxious to give their child every care and attention.

Unfortunately, however, there is a growing number of parents who do not seem to be able to look after their children in the way that they should, because the mothers need to or are going out to work. It is very difficult for the Nurses to contact these parents to discuss their children's problems with them, and then when the contact is made at their place of work it is often difficult for the child to obtain the requisite attention because the parents do not want to lose the day's pay when they take their child along for treatment.

It will thus be seen that the home visiting presents definite problems, but on the success of this work depends very greatly the success of the scheme as a whole.

One can visualise that it may be necessary to cater for parents who work and so the Nurses may be required to take the children—with the permission of the parents, of course—to hospital or the family doctor for treatment as this may be the only way to ensure that the children receive treatment.

As the office work in connection with this service has increased greatly, it has been found necessary to keep at least one Nurse permanently in the office on the clerical work of the School Medical section. Also, there is always a Nurse available to do special investigations.

Two thousand and sixteen home visits were paid during the year, of which 1,793 were in connection with children who required medical attention. Of this number it was found that 848 had received medical attention by the time the Nurse visited the home, and in the case of a further 428 children this attention was immediately promised. Nineteen parents stated they were disinterested, and as usual we found that our " floating " population was very large, because 498 families were either out or had left the district when the nurse called.

A total of 223 visits were paid to homes to ascertain home conditions. These are made in the case of asthmatic children, under-nourished or markedly nervous children, where we require to see the home conditions and have a talk to the mother about the child's problems.

Child Hygiene.

The usual very close systematic supervision was kept by the School Nurses on the cleanliness of the schools, particularly with regard to pediculosis. Through this constant supervision the percentage of verminous heads in the State Schools was only 0·2 per cent., and in the Convents 0·5 per cent, making the percentage for the whole State 0·307 per cent.

This very low percentage has come about through the persistent efforts of the School Nurses, together with the co-operation of the teachers in the Schools.

Correspondence Classes.

The principle of examining the children of the Correspondence Classes is still being carried on, and the School Doctor when in a district will see all children who are being educated through the Correspondence Classes if these children are brought in to the nearest State School. Many parents avail themselves of this privilege.

A large number of Correspondence children from all the outlying districts were brought to the Camp School which took place at Broome during the year, and the local Doctor on our behalf examined all these children. This was an excellent opportunity for getting in touch with children living in scattered and isolated places. A Doctor will do an examination of the children at all future Camp Schools.

Association with Silver Chain.

Arrangements have been made in outlying places with the Silver Chain and Bush Nursing Association where a Silver Chain Nurse is stationed (of which there are now four), for these Nurses to keep an eye on the shool children for us in regard to hygiene. The Nurses will do all follow-up work after the visit by the School Doctor. This scheme is so far working very smoothly.

Thanks are due to the Silver Chain Association for their co-operation.

CONCLUSION.

Interested organisations still continue to ask for an annual medical examination of school children, which is interesting as it shows that the public realises the value of this essential service even although it receives very little publicity. In conformity with experience in other countries I do not think a yearly examination in our State is warranted, but the service which we are now giving seems to be very satisfactory and is working smoothly.

The great difficulty, of course, is to give the service to the country areas, because officers do not like being away from their homes for long stretches of time and having to " live in a suitcase." Travelling on day by day and week by week is extremely wearing, particularly for women who are unable either to do or get their washing done because they are never in a place long enough. Also, they miss all the comforts and amenities of a home. The majority of country hotels do not provide anything more than the bare essentials. As a result of this, it is difficult to get staff willing to carry out this country work which involves, from a School Medical point of view, continuous travelling and never being settled in one place for any length of time.

I consider that the School Medical Service will always be necessary, even if a National Health Scheme does come into force, as it is amazing the number of medical defects which children have of which the parents are completely unaware. Therefore, unless the parents were trained to take the children to their own doctors for a yearly check-up, and I doubt whether this will ever come, in the interests of public health the School Medical Service will always be necessary. In fact, with the rapidly increasing population that we have in this State it is obvious that the service will have to grow and expand.

It must always be borne in mind that the essential function of the School Medical Service is " preventive," and it aims at achieving and maintaining health and correcting those physical and functional faults which lower the health potential of the child, leading to established ill-health in the adult. Our object must always be to see to it that our children have all or any defects corrected as soon as possible in their life so that they are in as perfect a state of health as possible. Then by constant supervision, we must see to it that they are kept at their maximum of physical efficiency. Our motto is " Keep the Well Child Well."

Visits should be paid to the homes of all children who have been notified as having some defect which requires medical treatment or which requires special home attention, and these visits should be made by the School Nurse within a reasonable time after the Doctor's examination. At the present time our School Nursing staff does not enable this to be done in the country areas, but it is hoped that with the extension of the service this will be possible.

The School Doctors report that in the majority of cases they receive great co-operation and help from the School Teachers, who are appreciative of the examination, but even so, closer co-operation between the Education Department and the Public Health Department is necessary. At the present time the School Medical Officers are conducting their examinations under extremely trying conditions due to the overcrowded state of the schools and it is hoped that as soon as possible properly equipped medical examination rooms with adequate lighting, heating and medical facilities will become available. At present owing to the excessive overcrowding of the schools it has been found necessary by the Teachers to use such rooms, where they exist, for other purposes.

Last year I said, and again I repeat, that I think we have every reason to be proud of the School Medical Service which covers the vast area of our State and which compares favourably with other countries. Nevertheless, we must not be complacent and must never cease to endeavour to expand the scope and value of this service even more, because on the health of our children depends the health of our State.

In conclusion, I would like to say a word in appreciation of the services of Dr. Ruth Anderson, who was our country School Doctor since May, 1926, and worked in the country continuously thereafter. Dr. Anderson did an excellent job of work and was very well liked by the Teachers and those with whom she came in contact in the country. She had a particularly difficult task as she was constantly moving around and living in a suitcase in outback country hotels, which must have been extremely trying.

Dr. Anderson rendered long and excellent service to the Department which we valued.

I would like to thank the School Doctors who have worked well and faithfully under the most difficult conditions.

The School Nurses also have my sincere thanks for the excellent work they have done.

E. M. STANG, M.B., B.S., D.P.H.,
Senior Medical Officer of Schools.

Appendix XVII.

SCHOOL MEDICAL SERVICE.

EXAMINATION OF METROPOLITAN AND COUNTRY SCHOOL CHILDREN 1954.

—	Number Examined.	Number Notified.	Number referred for Medical Attention.	Number referred for Home Attention and Observation.	Number requiring Dental Attention.	Skin Complaints.		Nutrition.			Eyes Medical Attention.	Tonsils Medical Attention.
						Number.	Per cent.	3.	Under 3.	Over 3.		
Metropolitan Schools.												
Boys	9,712	3,144	1,096	1,547	1,651	....	....	8,934	271	507	....	....
Girls	10,438	3,361	1,187	1,842	1,885	....	....	9,442	260	736	....	....
Total	20,150	6,505	2,283	3,389	3,536	1,269	6·30	18,376	531	1,243	832	331
Country Schools.												
Boys	10,477	5,115	1,949	1,503	3,387	....	....	9,190	460	827	....	....
Girls	10,337	5,050	1,951	1,838	3,292	....	....	8,720	435	1,182	....	....
Total	20,814	10,165	3,900	3,341	6,679	1,111	5·33	17,910	895	2,009	1,351	1,044
State Total.												
Boys	20,189	8,259	3,045	3,050	5,038	....	....	18,124	731	1,334	....	....
Girls	20,775	8,411	3,138	3,680	5,177	....	....	18,162	695	1,918	....	....
Total	40,964	16,670	6,183	6,730	10,215	2,380	5·80	36,286	1,426	3,252	2,183	1,375

Appendix XVIII.

The Commissioner of Public Health.

Following is my report on the activities of the School Dental Service for the year, 1954.

STAFF.

During the year four appointments were made but there were also three resignations, so that at the end of December the staff numbered nine, leaving five vacancies.

Facts and Figures.

Number of country schools visited	86
Number of metropolitan schools visited	17
Number of orphanages visited	9
Number of children examined	6,938
Number of children treated	4,222
Number of children who needed no attention	1,814
Number of children who were to receive private attention	265
Number whose parents desired no treatment done	637

Operations performed.

Silver amalgam restorations (fillings)	5,521
Copper restorations	1,391
Cement restorations	1,431
Porcelain restorations	540
Silver Nitrate treatments	661
Other Conservative treatments	6,005
Extractions	7,910
Prophylaxis	623
Talks, personal interviews, etc.	328

Work, mostly of an emergency nature, was done for inmates of Institutions as follows :—

Claremont Mental Hospital and Lemnos.

Appointments	408
Extractions	285
New dentures made	13
Repairs to dentures	44
Prophylaxis	8

Heathcote.

Appointments	482
Extractions	54
Repairs to dentures	3
Prophylaxis	5

Fremantle Prison.

Appointments	213
Extractions	176
New dentures	2
Repairs to dentures	15
Prophylaxis	5
Fillings	2
Other treatments	20

Wooroloo.

Appointments	220
Extractions	114
New dentures	16
Repairs to dentures	4
Prophylaxis	3
Fillings	4

Some time ago it was agreed that the part time emergency work which I carried out in the Institutions should be transformed into a full time job for one man and that the suitable equipping and staffing of the surgeries in the places concerned should be controlled by the Superintendent of the Perth Dental Hospital ; before the end of the year Wooroloo Sanatorium was taken over by him and it was expected that before very long the other Institutions would follow suit.

A. G. McKENNA,

Senior Dental Officer.

Appendix XIX.

Commissioner of Public Health.

I have the honour to present the following report on the activities of the Nursing Branch for 1954.

Hospital Inspections.

During the year 56 visits were made to Departmental and Non-departmental Hospitals. It was was not possible to visit the North-West and Murchison districts.

Six monthly inspections of all Private, General and Maternity Hospitals were carried out for registration purposes and in order to obtain a more efficient annual survey in this respect, it has been decided that on the occasion of the end of the year inspection, the services of a Health Inspector should be availed of.

Until this year, monthly inspections of the case books of Maternity Homes have been carried out. This year it was decided that a more efficient service could be given if the Maternity Homes were visited every three months and, in addition to the case books, the essential services, such as Labour Wards, Nurseries, Sterilizing and Pan Rooms, were inspected and reported upon.

Improvements and additions to Maternity Hospitals.

Deficiencies in respect of certain Private Maternity Homes were reported and the licensees thereof requested to bring up their premises to the standard required by the Department. The Licensees and Owners of two Hospitals, namely St. David's, Mount Lawley, and Beaufort, Midland Junction, were unable and unwilling, respectively, to do this and preferred to allow their premises to be de-licensed.

The Licensee and Owner of Harrisdale Hospital effected alterations and additions to the premises bringing the building up to an acceptable standard and the Licensee of Kensington Hospital is willing to commence alterations early next year.

Improvements to " C " Class Hospital.

In order to conform with " C " Class registration requirements, alterations were effected at the Bethel Hospital, Guildford.

Hospitals voluntarily de-licensed.

St. Anne's Convalescent Home, Railway Parade, Mount Lawley, was delicensed at the wish of the Sisters of Mercy, and the Licensee of the Grosvenor Hospital, Bunbury, did not seek renewal.

New License issued.

The James Pollard Aged Pensioners Home was opened during the year and registered as a " C " Class Hospital.

Private Hospitals acquired by the Government.

Both Tresillian and Lucknow Hospitals were purchased by the Government. Tresillian was leased to Miss Audrey Shaw and the lease of Lucknow is to be continued by the Sisters McMullen.

Rosella Hospital, Geraldton.

Owing to staff shortages, it was necessary to close the Rosella Hospital for some weeks. It was reopened as soon as staff were available.

New Sisters' Home, Bunbury Hospital.

In an attempt to solve the accommodation problem for Trained Nurses at the Bunbury Hospital, a large house was purchased in Cross Street and is regarded as the Sisters' Home. This has not proved to be entirely satisfactory, due to the distance from the Hospital, although the staff appreciate living away from the Hospital premises. The ten minute walk between the Hospital and the Home will probably cause more discontent during the winter months.

New Departmental Hospital.

The only new Departmental Hospital to be opened during the year was the Swan District Hospital with accommodation for 25 maternity patients. Miss Audrey Mann, Nursing Administration Diploma, was appointed Matron and the opening took place on 22nd September.

Post Graduate Education for Nurses.

During the year two Refresher Courses were held :—

(a) A Matrons' Refresher Week organized by the Australian Nursing Federation in co-operation with the Medical Department. Owing to staff difficulties it was not possible for all Matrons of country Hospitals to attend, though 26 did enrol and appreciated the course.

(b) A Public Health Refresher Week was organized by the State Committee of the College of Nursing, Australia, the Australian Nursing Federation and the Medical Department. This Course was most successful and attended by a large number of Nurses from all fields of nursing practice.

Post Graduate Diploma Courses.

Government Scholarships to the value of £1,225 were awarded for post graduate study at the College of Nursing, Australia, this sum financing two Nursing Administration and one Ward Sister Scholarships. The Nursing Administration Scholarships were awarded so that recipients would be available for appointment to Matronships of country Hospitals on their return to Western Australia. As a result, Miss M. Sutherland was appointed to the Bunbury District Hospital in succession to Miss Milne-Robertson who retired, and Miss M. Yates to Busselton District Hospital, both to take up duty in January, 1955. Sister Hewitt successfully completed the Ward Sister Course and returned to her position at the Kalgoorlie District Hospital.

Nursing Bursaries.

A scheme designed to attract school girls to the nursing profession by the award of Bursaries was launched this year. The Awards were available to students with the Junior Certificate to enable them to remain at school in order that a higher educational standard may be attained and also as a means of bridging the gap between school leaving age and commencing nursing training. The Bursaries are valued at £80 for one year's education and £160 for two year's education, the Bursar to serve for two or three years, respectively, as a Trained Nurse in a Hospital as directed by the Department. This Hospital would probably be a Training School either in the metropolitan area or the country. One year of this service could be spent in Midwifery Training if desired. There were 93 applicants but the grants were not finalised by the end of this year, as they were conditional on the results of the University Junior Examination.

GENERAL NURSING TRAINING.

Miss Harler, the Organiser of Nursing Training, reports that this year has again found the training scheme falling short of the required standard because of the persistent lack of Trained Nurses in the country hospitals.

The five hospitals working with the Central Training School in training nurses for their General Certificate have been short of " A " Class Ward Sisters. Clinical Supervisors are necessary for two of the hospitals. These personnel are most essential to maintain a steady and continued supervision of practical work and they also help the student nurse to correlate theory with practice. The supervision of the students' nursing is being done by Matron or a Sister, sometimes a Staff Nurse.

Recruitment.

The maximum number of students in training at any time in the Government Hospitals has been 160. At the end of 1954 there were 132 in training. In order to staff our Government Hospitals adequately with Student Nurses to the exclusion of Nurse Assistants 318 are needed to be in training, that is, an approximate intake of 100 a year.

The advertisement in the Press for the Country Training Scheme had some result but an even wider drive is necessary if we are to increase our numbers.

Miss Harler visited the High Schools at Busselton, Bunbury, Collie, Narrogin, Northam, Merredin, Kalgoorlie and Geraldton. Matrons of Hospitals in these towns were requested to invite students from the schools to the the hospital in order that their interest in nursing may be stimulated. This request has not been met by one hospital in the scheme of training, due, not to the disinterestedness of the Matrons but to staffing difficulties.

Visits made to Training Schools during 1954 :—

District Hospital, Kalgoorlie	2	
District Hospital, Northam	3	
District Hospital, Geraldton	2	
District Hospital, Collie	3	
District Hospital, Narrogin	3	
District Hospital, Merredin	3	Nursing Aide Training Schools.
District Hospital, Busselton	3	
Mount Henry Home	3	

Nurses Training School.

During the year it was decided that additional maternity beds should be provided at Devonleigh Hospital, and in order to bring this into effect, the Nurses Training School would have to be moved to another site. As a result, the building 18 Colin Street, West Perth, was purchased and alterations planned to bring the premises up to the necessary standard to accommodate Nurses in residence during the preliminary training period. A building to provide demonstration and lecture rooms was designed and work commenced, and it is hoped that the move will be made in June, 1955. It was anticipated that there would be sufficient accommodation at the King Edward Memorial Hospital Nurses Home to house the Block Nurses.

Report on the Intake and Output of Students.

Preliminary Training School.

Students, 1954.	Intake.
30th P.T.S.	10
31st P.T.S.	10
32nd P.T.S.	14
33rd P.T.S.	9
34th P.T.S.	14
Total	57

Resignations as from 1*st January, to* 31*st December,* 1954.

During Preliminary Training School—Total 10 resignations.—Of these, four were unable to cope with the course and were transferred to the Nursing Aide Course. Others resigned for various reasons.

During 1st *Year of Training*—Total eight resignations.—Three transferred to Nursing Aide Course. Others resigned for various reasons.

During 2*nd Year of Training.*—Seven resigned on account of marriage.

During 3*rd Year of Training.*—One resigned on account of marriage.

First Professional Examination.

	Passes.	Failures.
April, 1954 :		
Kalgoorlie	7	....
Northam	4	....
Geraldton	8	....
Collie	3	....
Narrogin	4	....
August, 1954 :		
Kalgoorlie	2	....
Northam	3	....
Geraldton	3	....
Collie	2	....
Narrogin	3	....
December, 1954 :		
Kalgoorlie	8	1—Anatomy and Physiology
Northam	1	1—Anatomy and Physiology Personal and Communal Health.
Geraldton	1	1—Anatomy and Physiology

Nurses completing Training and the Results of the Nurses Registration Board Final Examinations.

	Passes.	Failures.
February, 1954 :		
Kalgoorlie	8 (3 credits)	....
Northam	4 (3 credits)	....
Geraldton	3 (2 credits)	....
June, 1954 :		
Kalgoorlie	2 (1 credit)	1
Northam	1	....
Geraldton	2	....
October, 1954 :		
Kalgoorlie	5 (2 credits)	....
Northam	4 (2 credits)	....
Geraldton	3	....
Total completing Training	32	1

Heathcote Nurses.

Four nurses from Heathcote successfully completed their preliminary training period at the Central Training School during the year.

Lectures given in 1954.

The teaching staff of the Central Training School wish to express their appreciation for the co-operation they received from all the lecturers and also their thanks for the kindly co-operation of the members of the Chest Clinic, Medical and Public Health Department staffs.

Resignations and Appointments :

Miss V. Steel, Senior Tutor at the Central Training School resigned from this position in June, 1954.

Miss D. Sheehan, Clinical Supervisor, resigned from the District Hospital, Kalgoorlie.

Miss V. Hobbs Appointed Senior Tutor at the Central Training School.

Clinical Supervisors are still required for Collie and Narrogin District Hospitals.

REPORT ON THE NURSING AIDE SCHEME UNDER THE MEDICAL DEPARTMENT FOR THE YEAR ENDING DECEMBER, 1954.

Mount Henry Home.

Arising from the suggestion of the Matron, Mt. Henry Home, that the Home should be utilised for the training of Nursing Aides because Geriatric Nursing constitutes so large a part of the Nursing Aides' curriculum, the Home was included in the Department's Nursing Aide Training Scheme as from October, 1954.

It was planned that those Nursing Assistants already employed at Mount Henry desirous of undertaking a course of training, together with recruited persons, should do the preliminary and theoretical study and obtain practical experience in Geriatric Nursing under the supervision and instruction of a Tutor for six months, and at the end of that time the Student Aide would be transferred to a Country Hospital to complete her practical experience. It is a little early to assess the success or otherwise of this plan.

Busselton District Hospital.

The Busselton District Hospital was used for training Nursing Aides as from November, 1953, when five students enrolled, four of whom continued.

NURSING AIDES IN TRAINING FOR YEAR ENDING DECEMBER, 1954.

Hospital.	No. of Students carried over from 1953.	Commenced in 1954.	Resigned during Training.	Remaining in Training at the end of 1954.	Passed Examination.
Merredin	11	4	6	2	13
Busselton	4	9	2	3	8
Mt. Henry	....	12	2	10	....
Total	15	25	10	15	21

FIGURES ON TRAINING NURSING AIDES SINCE COMMENCED IN MARCH, 1953.

Year.	Hospital.	Commenced.	Transferred to General Training.	Resigned.	Passed Examination.
1953	Merredin	27	3	13	11
1954	Merredin	4	....	....	2
1953	Busselton	5	....	1	....
1954	Busselton	9	....	2	8
1954	Mt. Henry Home	12	....	2	....
		57	3	18	21

Remaining in Training at end of 1954.—15.

It will be seen that wastage is very high. All who sat for examinations were successful.

In concluding this report, I wish to express my thanks to you, Sir, for your kind encouragement in my work and to record my appreciation of the loyal co-operation given by Miss D. Railton, Assistant Matron, and of the work of Miss E. Harler, Organiser of Nursing Training.

PHYLLIS F. LEE,
Principal Matron.

Appendix XX.

NURSES' REGISTRATION BOARD.

Eleven meetings were held at the Department of Public Health.

The number of nurses in the various divisions of the register whose registrations or enrolments were in force at the end of the year, was :—

	1954.	1953.
General	2,454	(2,397)
Infant Health	214	(202)
Mental	57	(51)
Midwifery	1,200	(1,144)
Tuberculosis	57	(61)
Mothercraft	20	(25)
Nursing Aides	60	(45)

Figures in parenthesis are those of 1953 for comparison.

Twenty-four examinations were conducted, as follows :—

General	3
Mental	3
Midwifery	3
Tuberculosis	3
Mothercraft	3
Nursing Aides	3
First Year Professional	3
Educational	3

Three applications for restoration of names to the Midwives Register were approved under section 11 (3) of the Act.

In regard to nursing aides, during the year a reciprocal enrolment agreement was entered into with the Hospitals and Charities Commission, Victoria.

The name of one nursing aide was removed from the roll by order of the Governor under section 10 of the Act.

Appendix XXI.

INCIDENCE AND MORTALITY OF NOTIFIABLE INFECTIOUS DISEASES.

Diseases Notifiable.	1951.		1952.			1953.			1954.		
	Cases Re-ported.	Deaths.	Cases Re-ported.	Amended Diag-nosis.	Deaths.	Cases Re-ported.	Amended Diag-nosis.	Deaths.	Cases Re-ported.	Amended Diag-nosis.	Deaths.
Acute Rheumatism	8	....	9	9	....	24	24	(C) 4	60	60	(C) 8
Amoebiasis	5	....	5	5	....	....	....	....	8	8	....
Ankylostomiasis	13	....	8	8	....	2	2	....	2	2	....
Brucellosis	8	....	6	6	....	7	7	....	8	8	....
Chorea	....	....	3	3	....	6	6	1	6	6	....
Dengue Fever	....	....	....	....	....	1	1	....	2	2	....
Diphtheria	271	11	156	124	2	195	170	1	127	119	3
Dysentery (Amoebic)	2	....	6	6	....	6	6	....	6	6	1
Dysentery (Bacillary)	56	1	72	72	(B) 1	42	42	....	42	42	1
Encephalitis, Lethargic	....	....	....	....	....	3	3	....	....	....	3
Erythema Nodosum	....	....	....	....	....	2	2	....	1	1	....
Hydatid	1	....	....	....	....	....	....	....	....	....	1
Infantile Diarrhoea	46	(A) 30	15	15	(A) 17	4	4	(A) 8	29	29	(A) 22
Infective Hepatitis	467	3	654	654	9	443	443	1	166	165	4
Lead Poisoning	....	....	4	4	....	5	5	1	2	2	....
Leprosy	48	3	37	37	....	26	26	1	47	47	....
Malaria	7	....	13	13	....	25	25	....	29	29	1
Meningococcal Infection	20	3	35	35	4	25	25	6	48	48	3
Paratyphoid	3	....	3	3	1	1	1	....	1	1	....
Poliomyelitis	94	4	42	37	2	49	44	3	450	436	4
Pleural Effusion	....	....	21	20	....	9	8	....	4	4	1
Puerperal Fever	4	....	3	3	....	3	3	....	2	2	....
Purulent Ophthalmia	23	....	58	58	....	163	163	....	52	52	....
Rubella	137	....	147	147	....	1,053	1,053	....	627	627	....
Salmonella Infection	16	....	22	22	....	17	17	....	32	32	1
Scarlet Fever	179	....	128	125	....	94	93	....	92	91	....
Tetanus	12	4	13	13	6	12	12	6	4	*4	8
Trachoma	....	....	1	1	....	1,201	1,201	....	3,686	3 686	....
P.T.B.	467	73	524	488	75	376	370	43	368	344	57
Other T.B.	37	10	50	49	7	34	33	3	26	34	4
Typhoid Fever	11	....	6	6	1	7	7	....	12	12	1
Typhus Fever	24	1	25	25	1	18	18	....	19	19	....

Deaths include Full-blood Aboriginals. * Notifications incomplete.

(A) Gastro-Enteritis and Colitis (except ulceration) under two years and diarrhoea of newborn.

(B) Also one death from other or unspecified dysentery.

(C) Rheumatic Fever.

Appendix XXII.

MATERNAL MORTALITY.

Period.	Average Live Births.	Average Maternal Deaths.	Average Rate.
1901–1905	6,681	28·0	4·19
1906–1910	7,691	43·4	5·64
1911–1915	8,844	39·4	4·46
1916–1920	7,727	41·4	5·36
1921–1925	8,056	34·2	4·25
1926–1930	8,748	46·8	5·35
1931–1935	8,062	35·4	4·39
1936–1940	8,877	32·4	3·65
1941–1945	10,408	24·4	2·34
1946–1950	13,130	21·4	1·63

Year.	Live Births.	Deaths from.									
		Puerperal Septicaemia.		Other Puerperal Infections.		Abortion.		All other Complications of Pregnancy and of the Puerperal State.		All Complications of Pregnancy and the Puerperal State.	
		No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
1943	10,481	2	0·19	1	0·10	3	0·29	17	1·62	23	2·19
1944	10,870	2	0·18	2	0·18	5	0·46	18	1·66	27	2·48
1945	10,672	....	....	2	0·19	5	0·47	13	1·22	20	1·87
1946	12,105	....	....	3	0·25	5	0·41	18	1·49	26	2·15
1947	12,874	1	0·08	1	0·08	8	0·62	22	1·71	32	2·49
1948	12,981	2	0·15	4	0·31	1	0·08	13	1·00	20	1·55
1949	13,511	....	....	2	0·15	3	0·22	11	0·81	16	1·18
1950	14,228	....	....	2	0·14	1	0·07	12	0·84	13	0·91
1951	14,794	....	....	2	0·14	3	0·20	11	0·74	16	1·08
1952	15,413	....	....	3	0·19	3	0·19	12	0·78	18	1·17
1953	15,862	....	....	....	....	1	0·06	8	0·50	9	0·57
1954	15,928	....	....	....	....	5	0·31	7	0·44	12	0·75

All rates per thousand live births.

(7)—92503

Appendix XXIII.

STILLBIRTH AND INFANT MORTALITY RATES.

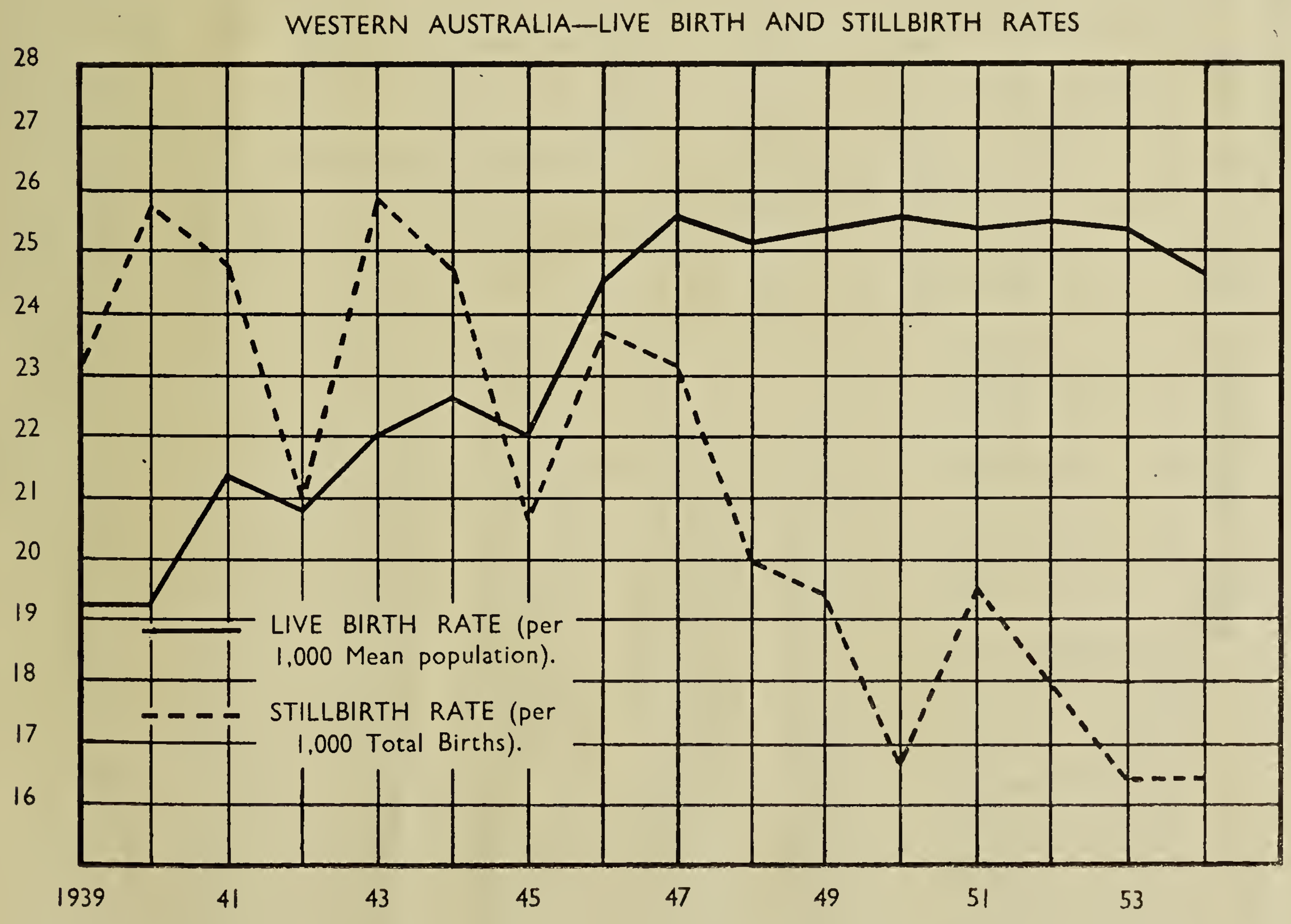
Year.	Total Births Including Stillbirths.	Stillbirth Rates.	Neo-Natal Rates.		Total Mortality Rates under One Year.	Other Post Natal Rates Over One Month and Under One Year
			Under One Week.	Under One Month.		
1926	8,534	27·4	....	27·6	48·0	20·4
1927	8,708	26·0	....	23·0	44·7	21·7
1928	8,981	30·9	....	23·1	35·5	12·4
1929	9,316	28·4	18·8	25·8	54·6	28·8
1930	9,456	27·0	18·0	23·5	46·5	23·0
1931	8,777	26·0	20·1	26·6	40·5	13·9
1932	8,175	25·7	21·02	25·2	43·5	18·3
1933	8,105	29·4	18·1	22·5	35·8	13·3
1934	8,029	29·2	19·3	24·8	38·8	14·0
1935	8,377	30·8	20·6	24·8	39·0	14·2
1936	8,730	28·9	19·6	24·8	41·0	16·2
1937	8,850	27·2	16·8	21·2	36·5	15·3
1938	9,325	23·9	16·6	19·1	33·1	14·0
1939	9,249	23·0	16·5	19·7	40·0	20·3
1940	9,363	25·9	20·5	24·9	43·0	18·1
1941	10,375	24·8	15·1	18·1	34·4	15·7
1942	10,109	20·6	17·1	20·3	36·2	15·9
1943	10,759	25·8	17·1	21·0	31·8	10·8
1944	11,144	24·8	18·6	21·0	32·0	11·0
1945	10,896	20·6	18·0	20·0	28·9	8·9
1946	12,398	23·6	17·1	20·6	30·3	9·6
1947	13,178	23·0	16·9	19·4	30·2	13·2
1948	13,197	20·1	16·9	18·7	25·0	8·4
1949	13,779	19·4	16·2	19·0	25·9	6·8
1950	14,468	16·6	16·2	18·0	26·7	8·6
1951	15,091	19·7	16·2	19·7	28·2	8·5
1952	15,697	18·1	15·5	17·7	24·5	6·8
1953	16,130	16·6	13·4	16·2	23·4	7·3
1954	16,198	16·7	14·2	15·8	22·2	6·4

In the above table all rates are calculated in deaths per 1,000 of total births, including stillbirths.

Appendix XXIV.

WESTERN AUSTRALIA–STILLBIRTH AND BIRTH RATES.

Year.	Mean Population.	Live Births.		Still Births.	
		Number.	Rate per 1,000 Mean Population.	Number.	Rate per 1,000 Total Births.
1939	469,780	9,036	19·23	213	23·03
1940	473,397	9,121	19·27	242	25·85
1941	473,988	10,118	21·35	257	24·77
1942	476,619	9,901	20·77	208	20·57
1943	476,745	10,481	21·98	278	25·84
1944	481,498	10,870	22·58	274	24·59
1945	487,510	10,672	21·89	224	20·56
1946	492,771	12,105	24·57	293	23·63
1947	502,949	12,874	25·60	304	23·07
1948	514,614	12,931	25·13	266	20·16
1949	532,589	13,511	25·37	268	19·45
1950	557,857	14,228	25·50	240	16·59
1951	580,289	14,794	25·49	297	19·68
1952	600,580	15,413	25·66	284	18·09
1953	620,988	15,862	25·54	268	16·62
1954	640,086	15,928	24·88	270	16·67



Appendix XXV.

MEAT INSPECTION FOR THE YEAR ENDED 31ST DECEMBER, 1954.

	Carcases Condemned.																		Part Carcases Condemned.								Organs Condemned.															
No. of Animals Slaughtered.	Emaciation.	Icterus.	Immaturity.	Moribund.	Piroplasmosis.	Unmarketable.	Pyrexia.	Gangrene.	Pleuro-Pneumonia.	Sepsis.	Traumatism.	Tuberculosis.	Actinomycosis.	Peritonitis.	Caseous Lymphadenitis.	Paratyphoid.	Polyarthritis.	TOTALS.	Abscess.	Actinomycosis.	Caseous Lymphadenitis.	Tuberculosis.	Arthritis.	Unmarketable.	Traumatism.	TOTALS.	Abscess.	Actinomycosis.	Angiomatosis.	Cirrhosis.	Fatty Infiltration.	Hydro Nephrosis.	Hydatids.	Melanosis.	Necrosis.	Peri-carditis.	Pleuro-pneumonia.	Tuberculosis.	Unmarketable.	Parasitic.	Caseous Lymphadenitis.	TOTALS.
Fremantle District (including Watson's Bacon Factory).																																										
Cattle 24,916	2	....	....	....	....	....	....	14	....	4	9	40	....	1	....	....	....	70	....	201	....	40	....	....	17	258	260	....	128	9	69	....	1	1	....	24	....	....	....	....	....	492
Calves 344	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sheep 207,569	399	....	....	9	....	10	11	4	....	14	9	....	....	....	24	....	2	482	....	....	43	....	16	....	5	64	....	....	....	....	....	....	2,266	....	22	....	....	....	....	....	....	2,288
Pigs 71,028	12	18	....	45	....	4	20	2	....	151	1	116	....	29	....	63	40	501	103	....	....	1387	56	1	418	1,965	....	....	....	304	....	21,310	1	....	6,393	4,549	....	....	....	....	....	32,557
Totals 303,857	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,683	....	....	....	....	....	....	....	2,287	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6,037
Midland Junction (including Foggit Jones Bacon Factory).																																										
Cattle 54,374	30	1	....	4	....	5	15	42	....	23	24	108	1	....	....	....	....	253	27	508	....	93	2	152	76	858	476	12	444	92	139	90	156	....	21	15	....	43	40	3	....	1,531
Calves 3,969	....	....	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	....	....	12
Sheep 432,252	1,361	45	....	209	....	20	35	14	....	10	36	....	....	1	7	....	29	1,767	....	....	54	....	40	959	5	1,058	....	....	....	5	52	....	6,289	140	....	....	....	....	264	....	6,616	13,366
Pigs 47,637	....	5	....	1	....	1	7	....	....	17	....	76	....	1	....	18	2	128	42	....	....	141	20	3	13	219	....	....	....	....	....	9,446	....	....	4,188	1	....	....	11	15	....	13,661
Totals 538,232	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3,198	....	....	....	....	....	....	....	2,135	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	27,570
Kalgoorlie District.																																										
Cattle 3,966	....	....	....	....	....	2	....	....	....	....	2	2	....	....	....	....	....	6	1	39	....	126	....	....	5	171	84	20	....	7	39	....	....	4	4	8	....	111	3	1	....	281
Calves 20	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sheep 42,354	....	1	....	2	....	5	....	3	....	1	10	....	....	2	1	....	....	25	....	....	23	....	4	....	6	33	....	....	....	....	....	....	1,819	2	2	....	....	....	10	1	18	1,852
Pigs 1,913	....	....	....	1	....	1	1	....	....	1	....	1	....	....	....	....	....	5	2	....	....	48	....	....	1	51	....	....	....	5	9	4	....	....	93	....	....	1	....	....	....	112
Totals 48,253	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	38	....	....	....	....	....	....	....	255	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2,245
Fremantle Meat Markets.																																										
Cattle 230	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	2	....	2	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	2
Calves 2,432	....	....	1	....	....	7	1	....	....	....	....	....	....	....	....	....	....	9	....	....	....	....	....	3	....	3	....	....	....	....	....	....	....	....	....	....	....	....	4	....	....	4
Sheep 1,497	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	8	12	....	20
Pigs 466	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	2	....	....	....	10	1	....	1	12	....	....	....	....	....	....	....	....	6	....	....	....	20	....	....	26
Totals 4,625	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	....	....	....	....	....	....	....	17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	52
Perth City Markets.																																										
Cattle 1,500	2	....	....	....	....	3	....	....	....	....	....	2	....	....	....	....	....	7	....	....	....	....	....	27	....	27	....	....	....	....	....	....	....	....	....	....	....	....	12	....	....	12
Calves 25,174	....	....	130	....	....	165	....	....	....	....	4	....	....	....	....	....	....	299	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sheep 2,266	15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pigs 1,863	....	....	....	....	....	3	2	....	....	....	....	2	....	....	....	....	....	7	4	....	....	3	....	....	....	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Totals 31,803	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	328	....	....	....	....	....	....	....	34	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12
Country Districts.																																										
Cattle 20,444	5	....	....	3	....	....	3	....	....	4	10	6	....	....	....	....	....	31	10	32	....	38	2	18	26	126	188	77	174	42	28	10	....	1	15	....	....	32	96	100	....	763
Calves 3,158	....	....	45	....	....	....	....	....	....	....	....	....	....	....	....	....	....	45	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sheep 160,947	564	5	....	29	....	22	5	1	....	11	65	....	....	....	....	....	....	702	23	....	124	....	51	1	31	207	207	....	14	972	268	65	....	91	19	....	....	....	225	2,983	....	4,844
Pigs 7,763	....	....	....	6	....	3	....	....	....	9	2	6	....	....	....	15	....	41	19	....	....	16	7	18	7	48	47	....	....	95	9	580	....	....	68	....	....	12	83	759	....	1,653
Totals 190,312	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	819	....	....	....	....	....	....	....	381	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7,260

Grand Totals of Animals Slaughtered :—*Cattle*, 105,430 ; *Calves*, 38,197 ; *Sheep*, 844,885 ; *Pigs*, 130,720.

TOTAL ANIMALS SLAUGHTERED AND INSPECTED IN COUNTRY DISTRICTS WHERE MEAT INSPECTION IS CARRIED OUT.

District.	Cattle.	Calves.	Sheep.	Pigs.
Albany	2,751	894	46,179	1,210
Bunbury	2,405	1,024	17,101	691
Busselton	1,298	88	8,651	241
Collie	888	282	4,858	414
Geraldton	1,596	121	21,350	565
Harvey	4,184	268	17,657	626
Katanning	830	41	5,932	208
Manjimup	1,336	126	8,174	564
Narrogin	1,235	46	7,860	381
Northam	2,221	218	17,731	2,100
Wagin	280	15	2,341	141
York	420	35	3,113	622
Total	20,444	3,158	160,947	7,763

Appendix XXVI.

REVENUE AND EXPENDITURE FOR YEAR 1954.

REVENUE.

	£	s.	d.
License Fees	38	15	0
Meat Inspection Fees	12,906	1	9
Fish Inspection Fees	716	14	3
Pathological Laboratory	3,025	10	7
Sanitation Refunds	10	0	8
Inspection of Plans (Septic Tanks)	10,467	12	6
Miscellaneous	2,657	16	6
Nurses and Midwives Registration and Examination Fees	1,680	6	4
Local Health Authority Recoups	....		
T.B. Diagnosis (Generally)	513,091	18	0
T.B. Diagnosis (Wooroloo)	36,184	14	5
Argentine Ants (Sale D.D.T. and Baits)	82	18	6
Health Supervision Charges	516	15	6
Maintenance Northern Territory Natives	722	6	8
Derby Leprosarium			
Baby Patterns	41	17	6
Hospital Benefits—Lepers	5,627	0	0
Supplementary and Organisation Benefits	3,927	18	0
Pharmaceutical Benefits	298	3	6
Poliomyelitis After Care	1,560	13	0
	£593,556	2	8

EXPENDITURE.

	£	s.	d.
Salaries (including T.B.)	366,200	16	6
Payments Local Health Authorities	10,825	8	5
School Hygiene	7,213	18	10
Travelling and Transport	3,772	2	7
Postage and Telephones	1,824	12	5
Laboratory	17,812	5	2
Venereal Diseases	2,828	5	1
Miscellaneous	7,396	7	7
Infant Welfare Centres	57,566	10	10
Maintenance and Transport of Lepers	30,841	18	8
Medical Officer and School Dentists Travel	4,633	4	8
Diphtheria Immunisation	28	11	7
T.B. Clinics	243,488	4	9
Poliomyelitis	36,597	3	0
Cancer Reserach	358	12	11
Sanitation Goverment Buildings	15,394	2	2
Coconut Compensation	7,518	5	4
Total Expenditure	£814,311	10	6

By Authority: WILLIAM H. WYATT, Government Printer, Perth.